9

BULLETIN OF THE

TAYLOR SOCIETY

AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE
AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

The Chief Executive's Job
A first step in the study of this important problem—a reconnaissance by the chief executives themselves —*page* 47

Success
A hitherto unpublished lecture to young men entering business by "The Father of Scientific Management." —*page* 62

Engineering Societies Building
29 W. Thirty-Ninth St.
New York

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APRIL, 1926 VOL. XI, NO. 2

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BULLETIN OF THE
TAYLOR SOCIETY
AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

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Management Week
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"Progress in Waste Elimination"

Comment

IN A recent letter acknowledging election to membership in the Taylor Society—from a prominent student of social problems—we were pleased to read the following sentence: "Certainly, I now feel the Taylor Society to be the most valuable of the societies dealing with social questions in the larger sense." This was appraisal of an unexpected nature, for the primary objective of the Society is the promotion of better *methods* of management, and the long run emphasis has been on technique.

HOWEVER, there are times, and the present is one of them, when promotion of a technique requires its examination from the point of view of its adaptability to evolving industrial conditions and ideals. A technique may admittedly be effective but the question may be raised whether it meets the demands of industrial ethics. Therefore of late the Taylor Society, as basic to the promotion of certain principles and methods of management, has fearlessly given time in its meetings for open-forum consideration of developing industrial conditions, developing industrial ideals as evidenced in new theories and practices, and the bearing of the technique on these and on fundamental and enduring social values generally.

THE objective of the Taylor Society is promotion of that better management which is characterized by utilization of engineering methods in the solution of management problems; scientific investigation of conditions and scientific construction of methods of action required by the conditions. Management is a function of organized joint effort for livelihood. Livelihood is the most fundamental of individual problems, and, because livelihood efforts are now cooperative, one of the most fundamental of social problems. The best management methods, methods which will not be obsolete as soon as they have been acquired generally, cannot be discovered and promoted without sincere effort to make them consistent with developing patterns of thinking and of conduct, and without inquiring into the emerging ideals and habits with which they must be consistent.

THERE has recently come to our attention a book which illustrates Taylor Society contributions to technique, and the fact that contributions if fundamental will eventually have influence even if at first not appraised at their true value. This, by the way, is in the fields of sales and of accounting, fields to which the Taylor Society is assumed by some to have given minor attention. In Hilgert's "Cost Accounting for Sales" our Bulletin totals a higher number of foot-note references as authority than any other single source. We must give credit, as is done by the author of this book, for these contributions through the Taylor Society, to John Williams' expositions of "A Technique for the Chief Executive," and to Charles Staubach's expositions of "Sales Quotas." So far as concerns the highly technical matter of sales accounting, the evidence of this book is that the Taylor Society, presenting Messrs. Williams and Staubach, has made a contribution of fundamental and permanent value.

AT A special meeting of the Taylor Society held in New York, April 26, the members unanimously authorized the directors to incorporate the Society under the laws of the State of New York. Incorporation is in this instance the result of evolution rather than of preconceived plan. Most similar associations are organized as the result of carefully made plans to further some particular interest, such as improvement of the conditions of a profession; these plans usually and properly provide for incorporation. However, when the Taylor Society came into being (we purposely avoid saying was organized) some fifteen years ago, it consisted simply of a small group of a dozen or fifteen men who were interested in the study of management and found no available forum for the discussion of such problems. There was no motive of "propaganda" or of elevation of the status of a profession (for none existed); the controlling motive was to preserve and promote straight thinking concerning scientific management at a time when the efficiency craze was tending to pervert such thinking. There was no "organization" for several years, and when organization was effected it was of the simplest kind. Gradually the Society has grown to a membership of some 750, and is doing a work generally recognized as socially constructive. It has earned the right to corporate existence.

THE articles printed in this issue should satisfy a wide variety of membership interests, for they represent a section out of the December national meeting of the Society, sections out of seven local group meetings, and a hitherto unpublished address to young men by Frederick W. Taylor. The abstract of the discussion by major executives of the relations of a chief executive to his principal executive associates reflects one of the most important discussions ever held at a meeting of the Society. This is to be followed by a discussion of "top control" at the forthcoming Cambridge meeting, and by consideration of related topics at the national meeting in December. Taylor's lecture on "Success," intrinsically as well as historically should interest all young men of four score years or less; and in that connection we are pleased to present a talk to young members recently given by C. L. Barnum, one of the younger executives of the Taylor Society directorate. The seven talks before local groups are well worth attention. Readers will not fail to note the interesting experiment offered by the Delaware & Hudson Railroad; also that the social philosophy expressed and implied in the article is quite in contrast to that expressed in the Beyer-Jewell-Thornton addresses printed in the February issue.

Keppele Hall

June 10, 1872 April 25, 1926

The passing of Colonel Keppele Hall, after a brief illness attending an attack of influenza, deprives the Taylor Society of an esteemed and beloved member. During the ten years of his membership, he contributed full measure as director and as member to the work of the Society; when called upon he was ever ready both as counselor and as detail worker.

Colonel Hall possessed certain strong characteristics in rare combination. An engineering temperament and training made him a master of scientific management technique. Perspective, vitality of judgment and adaptability made him a superior executive. Poise and calm in periods of difficulty made him one in whom associates had confidence. Simplicity and nobility of character made him a friend whom friends held dear.

The extent of Colonel Hall's contribution to the management movement is not generally appreciated for he was an infrequent contributor to technical literature. In the judgment of engineers and executives associated with him his service, through the channel of conferences and personal counsel, was of major importance.

The Relations of the Chief Executive to His Principal Associate Executives

Analysis of a Discussion at the December, 1925, Meeting of the Taylor Society[1]

By **H. S. PERSON**
Managing Director, Taylor Society

THIS was the first of a series of discussions, planned for successive meetings of the Taylor Society, the object of which is a study of the function of the chief executive. It is hoped that there may eventually result, if it be possible, a "job analysis" of the position of the chief executive. This first discussion, in which executives of major responsibility participated, was intended to be simply a reconnaissance and was informal. A verbatim report therefore is not in order. It seems desirable, however, to put on record a general appraisal of the results of the reconnaissance and to call attention to some of the principal ideas brought out in the discussion.

To give participants in discussion something concrete to consider, a particular device was adopted. Several individuals who had had many years' experience which involved directly or indirectly a placement service were requested to list comments on the work of chief executives which had come to them in confidential interviews with subordinate executives seeking new positions. These lists were consolidated and classified and from them certain propositions were formulated. These propositions, which constitute essentially the views of subordinate executives concerning the functions and practices of their superiors, were submitted in advance to the discussors as points on which to focus attention.

These propositions, together with points brought out in the discussion of each, are presented seriatim below. At this point, however, a word should be said about the meeting in its general aspects. It appears to be common judgment of the several hundred persons in the audience that the discussion was most inspiring. The personal power and the prestige of those who participated were evident throughout the proceedings. The inspiration of the several contributions was perhaps enhanced by the fact that few discussors considered the propositions categorically and in detail. The discussion consisted on the whole of the presentation of ideas and judgments suggested not only by the propositions but also by the circumstances. As one discussor put it, it constituted a "first rough survey—a collection of individual and somewhat helter-skelter contributions." Individuality on the part of each participant in the selection of propositions for discussion and in the order of their consideration—and perhaps also in disregard of them—and the fact that at no moment did the audience know what a speaker would bring out next, added piquancy to the discussion.

It appears also to be the common judgment of the discussers as well as of the audience that the study of the job of the chief executive begun at this meeting should be continued—continued in a serious manner and by the major executives themselves. As one of the discussers put it, Who but the chief executive feels the liberty to study the chief executive's task, especially to bring out shortcomings? Time study specialists, methods engineers and others study every job except that of the major executive; but if the logic of a situation demands that they analyze the work and bring out the deficiencies of the chief executive, they do not consider it expedient to follow the logic. Yet the chief executive's job should be studied, for few are free from policies and practices of executive procedure which limit organization efficiency. In the past emphasis has been upon investigation and improvement of the detail work of operatives. Yet "if you have detail operatives 100 per cent efficient and have an executive at the top who is only half as good an executive as they are workers, you are going to lose a great deal more by the failure of that executive than you will gain by the efficiency of your workers." "Inefficiency begins at the top and trickles down; it does not begin at the bottom and trickle up."

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[1] December 4, 1925; Engineering Societies Building, New York City. Presiding: Henry Bruère, Vice-President Metropolitan Life Insurance Company, New York. Participants in discussion: Howard Coonley, President, The Walworth Company, Boston, Mass.; Henry S. Dennison, President, Dennison Manufacturing Company, Framingham, Mass.; A. Lincoln Filene, General Manager, William Filene's Sons Company, Boston, Mass.; Keppele Hall, Consulting Engineer, New York; H. W. Jeffers, President, Walker-Gordon Milk Company, Plainsboro, N. J.; Samuel W. Reyburn, President, Lord & Taylor, New York; Rumsey W. Scott, President, American Cable Company, New York; and Percy S. Straus, Vice-President, R. H. Macy & Company, New York.

A study of the function of a chief executive, a codification of principles and of practices governing the performance of his function, would constitute an immense step forward in the study of management. "I often sit in the presence of great business men," said the chairman in his opening remarks, "and bitterly regret that the knowledge that is confined within their minds must, because of lack of time or of willingness or of ability to communicate it, pass with them and not be left behind to guide others who follow in their footsteps. We are greatly at a disadvantage in spreading a knowledge and a philosophy of management because the leaders of business are so inarticulate." If they be inarticulate, and if for that reason we are at a disadvantage in spreading a knowledge and philosophy of management, there rests on chief executives a moral obligation to correct this sin of omission. There is no better place for a beginning than in a study of their own function in management.

The first group of propositions submitted as a basis for discussion follows:

I. Fundamental Aspects of Relationship

1. *The primary function of the chief executive, in his relations to his associates, is to inspire, inform and lead, and to coordinate specialized, related efforts to accomplish a defined common purpose, at the same time leaving to each staff executive responsibility and authority to devise and apply methods for accomplishing that for which he is responsible.*

2. *A chief executive can most effectively inspire, inform, lead and coordinate by development of the following procedure in relations with associate executives:*

a. Consultation through conference concerning proposed purposes, policies and general plans, or modifications of these.

b. Information and explanation through conferences concerning adopted purposes, policies and general plans.

c. Joint participation of associate executives in the translation of adopted plans into specific working plans and schedules.

d. Continuing inquiry through conferences concerning business conditions and tendencies, fundamental principles of management, and new ideas and practices in management.

e. Joint appraisal of results of operations, with emphasis on shortcomings, in order to determine and eliminate the causes of shortcomings.

It was to this group of propositions that every speaker gave most of his attention; in part because they were first in order and in part undoubtedly because they are concerned with fundamentals. Within this group attention was given principally to the more general statement in paragraph 1; the more detail propositions in paragraph 2 were generally not separately considered. Every speaker agreed that the primary function of the chief executive is to inspire, inform, lead and coordinate. There seemed to be a general judgment, however, that these four words do not express all the fundamentals involved in the function of a chief executive. He must be a "taker in" as well as a "giver out"; he must be informed by his associate executives as well as inform them; he must receive inspiration from them; and even coordination of their work must be in accordance with some things which they give to him—their natural and acquired capacities, their individualities, their several goodwills.

With respect to inspiration, one speaker expressed the judgment that in many instances a chief executive might inspire his associates by virtue of a power in his personality, but that in many other instances that personal power might be absent—it is not always personal power that makes a man a chief executive. The chief executive should get over his "superiority complex." Of course there are geniuses, but generally the chief executive is not necessarily different in essentials so much as in accidentals from one of his department chiefs. The individual who sets out deliberately and consciously to inspire by force of his personality is likely to be a sorry failure. Inspiration may be effected probably more by creating an inspiring business and organization environment than by any personal power. This environmental inspiration may come from "the purpose and ideals of the business, the make-up of the organization, friendliness, common sense, personal efficiencies, and business manners and decencies."

With respect to information the chief executive is both a giver and a receiver. He receives information from his associate executives, who are nearer detail operations, out of their more abundant information concerning details of the business. They are as a whole more informed than he concerning those things to be seen by looking in upon the operations of business. The information which he has to give them is more likely to be, because of his outside contacts, concerned with the outside influences on the business, the environment in which it operates. It is in the contact of chief and associate executives that these separate groups of information are brought together. One speaker expressed the view that, on the one hand, greater opportunity should be given associate executives to have outside contacts that they might bring information from the environment filtered through their particular capacities for observation and interpretation, and that on the other hand, the chief executive should be more informed concerning inside technique so that, like the back on a football team, he might come in as "secondary defense" in emergency in the management of a department.

With respect to leadership, the question was raised, but not answered, as to what constitutes leadership. Leadership is something more than mere authority to direct; personal power to inspire is involved, superiority in information of far-reaching and vital importance is involved; capacity of vision into the future is involved. One speaker called attention to the necessity for imagination in a chief executive, and having it, of the necessity for contributing it in his relations with associate executives. Another speaker implied that the associate executives as well must and do have imagination, but that a special aspect of the function of the chief executive must be to specialize on imagination. "An executive in any position should go ahead of today. The so-called higher the executive the farther he ought to go ahead, and I have specifically taken it as a definite part of my job to watch 1935 and 1936. I want to watch and analyze trends. What is going to happen to this line, to that line? We want to take as much as possible out of the hands of Lady Luck; we want to know the natural course of events." It is a particular responsibility of the chief executive to exercise imagination as a starting point for investigation and scientific determination of the direction of progress.

It was generally agreed that coordination is a primary responsibility of the chief executive. Coordination is to be effected first by clean-cut analysis of departmental functions and clean-cut definition of purposes and responsibilities. The chief executive should have the wisdom and the courage to put down in black and white a clear statement of purposes, policies and procedures. These understood, coordination is in large measure achieved. Coordination may be promoted by advisory conferences and committees, considered below.

It appeared to be the judgment of those who made reference to the matter that chief executives in efforts to secure coordination should not go too much into detail direction of the work of their executive assistants. Subordinate executives should have the privilege of that peculiar education for higher positions which comes from assumption of responsibility even at the cost of making mistakes. The responsibility of the chief executive in this connection is chiefly to see that the cost of education through assumption of responsibility and making mistakes is not greater than the value of the education derived from the experience.

Nearly every discusser referred to the proposition concerning conferences, and every one who considered it approved the proposition. It was agreed that conferences should pervade the organization, conferences not only of the chief executive with his principal executive assistants, but also of each responsible executive with his principal assistants, all the way "down the line." These conferences or committees should be advisory, not executive. They should be concerned with purposes, policies, projects, plans and problems of execution; they should be an aid to executives with strictly defined responsibilities and authorities; but they should not have executive power. That should be left to responsible executives.

There was general agreement that conferences should be genuine conferences, meetings at which individual sources of information and judgment can be tapped, at which individual abilities may be developed. The chief executive should not monopolize conferences as an opportunity for "lecturing, giving orders, and calling down for mistakes." One speaker, however, expressed the view that a chief executive is too busy a man to be concerned with a "debating club," that he has ideas to "get over," and that he may legitimately use the conference for this purpose.

In his discussion of the conference as a managerial institution, one speaker raised the question whether the chief executive of the earlier type is possible in the large organizations of today. A large portion of the responsibilities with which the earlier type of chief executive was intimately concerned—matters of departmental execution—must now be left to department chief executives with adequately defined responsibilities. Another considerable portion of the responsibilities of the earlier type of executive—determination of policy, projects and plans—cannot be carried adequately by a single individual. Is not the conference and committee system, properly developed, really a *composite executive* which aids, on the one hand, the chief executive in carrying the policy and project portion of executive responsibility, and on the other hand, the several departmental executives in carrying the responsibilities of detail execution?

Several times in the course of the discussion of this group of propositions reference was made to *ideal* relations and *practicable* relations between the chief executive and his associates. Those who made such reference agreed that a chief executive should set up in his mind an ideal organization and ideal routine of relationships, based on the assumption that the enterprise has been functionally analyzed and suitable individuals for each function are available, and that the chief executive should have this ideal plan in mind in the development of the organization. However, experience has demonstrated that it is practicably impossible to bring together individuals each perfectly equipped for a particular function. Individuality is a powerful element in any group composed of persons who have been chosen for executive positions in large part just because they have individuality. Furthermore, each individuality will develop new qualities under the influence of any particular association of individualities. Therefore the chief executive is under the compulsion of modifying his ideal plan to conform to the particular characteristics of the group of executives associated with him. The truly great chief executive is he who has a wise ideal plan, calls to associate with him such individuals as conform reasonably to the requirements of the plan, then by force of personal educational ability and by force of the moulding influence of the environment he creates, causes these individuals to grow into truly functional cooperative relationships, and at the same time brings out in each individual all his valuable peculiar potential capacities.

The second group of propositions was as follows:

II. Detail Aspects of Relationship

1. *Until such time as the procedure outlined above has resulted in the establishment of an understanding staff group, each member with a proved, coordinated departmental policy and procedure, the chief executive should keep in close — daily — contact with staff executives and operations.*

2. *The principal activities of the chief executive should be concerned with*

   a. *The responsibilities outlined above (I-1, I-2).*

   b. *Exceptional problems of operation resulting from unexpected situations and miscalculations.*

   c. *Failures in coordination of work of associate executives.*

3. *The chief executive should define clearly each staff executive's responsibility and its relations to general purpose and plans; and should grant each executive adequate corresponding authority.*

4. *The chief executive should establish and observe a routine of executive work and of relationship to executives; he should not, for example, directly instruct or discipline the subordinates of a staff executive.*

5. *Chief executive decisions and orders should be fully explained.*

6. *In his contacts with associate executives the chief executive should be*

   a. *Assured of his facts and conclusions, and not convinced of his infallibility;*

   b. *Direct and firm as supervisor and appraiser, but courteous;*

   c. *Patient in expectation of understanding and action by associate executives with respect to new propositions which he alone has had time to investigate and consider thoroughly.*

7. *The chief executive should use the conference as an opportunity for self-expression on the part of his associates and for securing their judgments, but should not misuse it as an opportunity for expressing himself only and imposing his own judgments.*

8. *Staff executives should be developed within the organization; the chief executive is morally bound to exhaust every resource in developing junior executives to capacity to assume staff responsibility; for every executive there should be in the organization a competent alternate.*

9. *The chief executive should establish clearly defined principles of remuneration of executives along the following lines:*

   a. *Remuneratoin should be direct and at regular intervals—in the form of salary;*

   b. *Remuneration should not have as its major element profit-sharing rewards of supposed distribu-*

tion of profits which tend to depress standard salaries;

c. Remuneration should increase with experience and length of service;

d. Remuneration should be based on measured contribution of each position to the common result.

10. *Provided there is not opportunity for promotion, the chief executive should "graduate" out of his organization into positions in other organizations which he has helped to discover, such of his executives as have developed ability and capacity greater than is required by and adequately remunerated in the position now occupied.*

As stated earlier in this report, this group of more specific propositions did not receive much consideration, chiefly because the available time was exhausted in discussion of the first group of more general propositions. However, the second group of propositions was referred to as a group a number of times in discussion; in most instances with general approval without exceptions, and in several instances with general approval but with certain exceptions. It is these exceptions which should be noted in the record.

Proposition II. 4—that the chief executive should establish and observe a routine—was not disapproved, but the example utilized in explanation—that a superior executive should not directly instruct or discipline the subordinate of an associate executive—was disapproved. It was asserted in that connection that there should be free intercourse between the chief executive and any member of the organization, of whatever degree of responsibility, that the chief executive should be accessible to any subordinate and any subordinate accessible to the chief executive. There should be no such sense of rank, higher or lower, as to impair good fellowship throughout an organization.

As understood by these particular discussers, the example cited in the statement of proposition II. 4 was subject to criticism. But it was not intended that it should be so interpreted. Obviously the example was not happily worded. The example was intended to be so worded as to disapprove the practice of the chief executive who, walking through plant or store, observes something which he thinks is wrong, and immediately and publicly "calls down" the workman or sales person involved. The chief executive does not know the circumstances lying behind the act or situation to which he objects. To him, the responsible person should be the department head. This is quite a different matter from being accessible to all individuals in an organization. The example supporting proposition II. 4 should have been so stated as to assert that the chief executive should establish and observe an understood routine of executive relationships which, on the one hand, would prevent his undermining the responsibility of a department head by giving casual instructions directly to a subordinate of that department head (except when functional responsibility requires such direct instructions); and, on the other hand, would provide accessibility to him for any member of the organization. The two are not inconsistent. If a clerk gets out a report to the chief executive in a form not agreeable to the chief executive, it is the supervisor of that clerk and not the clerk himself who should receive instructions from the chief executive as to the form desired. On the other hand, if the clerk believes he is not receiving adequate instructions or fair treatment from his supervisor, and if he wishes to appeal to the chief executive, the way should be clear.

Exception was taken by one discusser to proposition II. 9. c. as stated. He raised the point that while agreeing in general with the proposition, remuneration should increase with length of service only "in case the mind and spirit of the employees grow." Responsibility to the employee who does not grow is a difficult problem.

Proposition II. 9. d. was commented on by several discussers. Although all who referred to this proposition were in general agreement with it, they called attention first to the difficulty of determining what elements enter into contribution to the common result; and second, the difficulty of measuring the elements that it is agreed do enter into the common result. You can't judge an executive's earnings by the balance sheet. It is inanimate; it is cold. It is a list of material things. You have got to get right down to each individual and find out how much he contributes to goodwill and esprit de corps, contributions which cannot be identified in the income statement. It is not impossible to rate the goodwill-building ability of executives and it is desirable to consider that, in addition to the profits he turns in, as a basis of remuneration.

It it hoped that the plans of the Taylor Society for further inquiry into the work of the chief executive may be carried on, and that the only individuals who are in a position to pursue that study—the chief executives themselves—will appraise the results of this reconnaissance as warrant for continued active participation in the inquiry.

Scientific Business Forecasting[1]

Methods Used by a Philadelphia Concern and Resulting Benefits

I. By J. L. STONE
Head of Statistical Department, Henry Disston & Sons, Philadelphia

II. By S. L. KEDERSKI
Statistical Department, Henry Disston & Sons, Philadelphia

I. By J. L. STONE

WHAT Mr. Taylor said of scientific management in general, we may say of forecasting in particular. It "does not necessarily involve any great invention, nor the discovery of new or startling facts. It does, however, involve a certain combination of elements which have not existed in the past, namely, old knowledge so collected, analyzed, grouped and classified into laws and rules that it constitutes a science."

Back in the slump of 1921, our orders somewhat resembled a tennis game. A high lob had been shot up. The stroke for that lob started in 1916. In 1920 the ball, or our orders, reached its zenith and started rapidly to descend, striking ground, or the bottom of our depression, in June of 1921, rebounding like a tennis ball with almost the same rapidity with which it had descended.

In 1921 our factory and shop organization had been pruned to the limit and the wheels of our industry were scarcely revolving. Those wheels, once they had been slowed down, were very difficult to speed up again. A lot of our skilled shop hands had scattered out on farms or wherever they could get a job and were hard to locate. New men had to be broken in at great cost, machines reconditioned, more clerks hired, and so, after this emergency stop, our wheels were locked for a while.

We all know the cost which all this involved, the hardship on shop and office employees. Had we slowed down a little sooner and produced more for stock, knowing the rapidity with which our orders would recover, a great deal of money could have been made and saved and a lot of hardship avoided. But we did not know that business would bound up again so rapidly—because we were not forecasting. That experience convinced me that there ought to be some way to avoid such a condition again. Being in charge of the Statistical Department and having all the records available, I decided to study them with this thought in view.

About the same time I became interested in the Harvard Economic Service and particularly in Harvard methods, reduced our own figures to cycles by the method of standard deviation, and discovered how closely they correlated with Harvard curves. That was encouraging for it showed outside figures available to check against. In revenue that seemed fairly simple but in quantity figures it seemed hopeless, in view of the number of articles manufactured, some 20,000 items in saws and tools and manufactured steel. We have six manufacturing branches in the United States, two in Canada, and one in Australia.

The 20,000 items we manufacture are divided into four classes: Shelf or Hardware goods which are sold through jobbers to hardware stores; Mill goods which go to saw mills and wood working industries; Machine Knife business which goes to the same market as the Mill goods and is a direct selling proposition; and Milling saws, the metal cutting saws, also a direct selling line. I am not giving our organization this publicity for advertising purposes, but to show you that your business is "no different" and that no matter how varied your line and marketing may be, your problem can be solved and usually in quite a simple way. One thing that was a help (while I am still blowing our own horn) is that ours is entirely a quality line. We have no second quality goods, which tends to simplify marketing and distribution problems.

The next step we took was to try to find a leader in the four groups just mentioned which could represent each group fairly accurately. In this we were fairly successful, and very lucky in finding one line of saws which was a good thermometer and barometer of the whole organization. (See Figure 1 for a comparison of our Alpha orders and total sales revenue.)

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[1] Papers presented at a meeting of the Philadelphia Section of the Taylor Society, December 16, 1925.

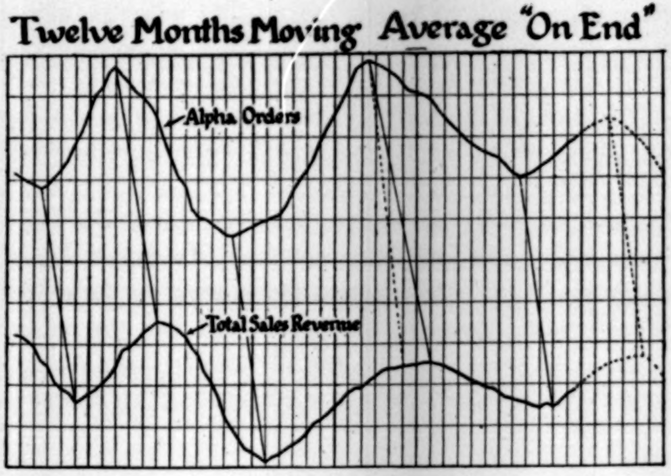


Figure 1

We then discovered we had an excellent forecasting curve for the various forecasting services on the market, leading them by, on the average, three months, the coefficient of correlation being about .9. This correlation held until about the middle of 1924 when manufacturing fell off as you remember and consumption held up fairly well. We are one of the leaders in the business cycle; that is we are one of the first to advance and decline. Having discovered that we were leading in the race over the rolling and hilly course of the business cycle with no pace setter ahead of us, we, the Statistical Department, decided that since we had no service on the outside to show us the course in this race, we had better study our own growth, marketing and distribution before boldly rushing to the next hill of prosperity on the race track of business.

Fortunately I had been in the employ of Henry Disston & Sons for some years and had always been interested in our past growth and general history. Moreover, we have quite a few very old employees, some of whom have worked with our founder, Mr. Henry Disston. From these men and our records, I had a pretty good knowledge of what had happened in the past. Such an intimate knowledge of one's organization and history I consider a big help in forecasting. These can always be supplemented by valuable data on competition and your own growth against competitors, available at Washington or state capitals. If you are large exporters considerable information is available on that subject also.

So, I should say, knowing your own history and business, then knowing nearly as well all other industries that affect your own, is the ground work for forecasting. The man responsible for the forecast will not have much time to read the Saturday Evening Post in his evenings; he will have to do much other reading to keep himself up to date on general economics. In our organization we have five people in the Statistical Department, including one man who spends practically all his time at work similar to that of a librarian, reading and clipping magazines, following up books that may be of value, noting at what library they are available should they not be of sufficient immediate value to purchase. This work is very important and helpful. The mass of general and specific information he secures is naturally of great value in forecasting, for reference and checking.

As examples of the sort of information we have available, I might mention the stand and location of all standing timber by kinds and pin maps showing location, size and kind of saw mills, hardware stores and jobbers, by states. We have also done some field work and made a good many studies on distribution. Our export salesmen have cooperated very nicely in sending in books and circulars on whatever country they may be in; in that way we have accumulated quite an export library at practically no cost. This is a help in export forecasting as one must know the economic condition of a country in making a forecast for it. It also helps to interest the salesmen in this kind of work. Merely asking their opinion on general conditions is likely to bring us too optimistic a statement. Of course Production, Expense and Sales Records and Charts constitute the rest of the Statistical Department's tools for making our forecasts.

Having studied our own field and history, we next made intensive studies of general statistics such as New Building, Textiles, Pig Iron and the various other data available on general business. These studies showed, as had our comparisons with the Harvard curves, that we were moving in a general way with business—sometimes ahead, sometimes in lag. Eventually we made our own business curve or demand cycle and reported monthly to our executives on business and the prospects in view, but this did not seem to be putting the forecasts to very practical use. They were interesting, no doubt, but their actual value was hard to demonstrate. Just when I was endeavoring to see how I could better this condition, our department was requested by our executives to start on budget control for the whole organization.

This, of course, was the one thing needed to make our forecast definite and practical and a means to a more intelligent control of our plant, through knowledge of what business is likely to be in the next twelve months of the budget period. I shall not go very deeply into the subject of budgeting because that is not the subject I have been asked to speak on but it is necessary to refer to it, as budgeting is the logical sequence to forecasting and the one helps the other. Without forecasting, our executives could know what we were capable of producing but they could not tell very definitely whether general business was going to be good or very good, or whether the majority of our business would come in the first half year or the last. In other words, they could not know what part of the business cycle we were in. This we could easily show them with our own charts in conjunction with the other curves with which we ran in phase. Most people seem to think that we always travel in a straight line and that it will be an easy matter to increase sales a little next year, although we may be at the peak of a cycle and likely to go down.

Our procedure on our estimates or forecasts is to complete our budget by November; that is, our budget for 1926 was completed in November, 1925. Our forecasts are made fifteen months in advance. The current year, or we will say 1925, is projected to get the totals for 1925 and then our extensions for the whole of 1926 are made. As I stated before, our forecasts or estimates are all contained in the budget.

The Budget Committee meets and discusses the various estimates, so that Sales, Production and Financial heads may study these estimates. The Budget Committee holds a second conference a few days later and either recommends that the budget figures be accepted as they stand or suggests slight changes. Usually the budget is not changed, the feeling being that the Statistical Department has made very careful studies and has given a fair, logical estimate and one not too easy of attainment; that it is thoroughly familiar with plans and policies of other departments and has made due allowance, for example, for a number of new salesmen who may be taken on during the year, the advertising policy or any other matter pertaining to the sales policy for the next year.

The value of these forecasts to our executives may be briefly stated as follows. They tell the General Manager (who is also Budget Manager) how the various divisions, such as Sales, Production and Finance, will function monthly throughout the year, supplying him with a measuring stick with which to check their actual attainments. He has a complete picture of the next twelve months in advance which enables him to see that the way is smoothed and cleared to attain these budget figures.

The budget is not centered on merely increasing sales but puts as much emphasis on reducing expenses. The gradual increase in sales and decrease of expenses by budgeting is, of course, largely due to the team work which the budget brings out. In other words, everyone in the organization is striving to make our sales for the year a certain definite amount, the budget figures for sales. As we are all striving for the same figure, we reach it. We are all pushing in the same direction, not pushing certain articles and forgetting others, not striving to sell too much in a certain territory that cannot assimilate it, thereby increasing selling expense, and forgetting another section of the country which can take it. Our ability to do this comes through research in the field and into each department in our organization.

As to expense the head of each department goes over the figures and agrees to the sum set for his department. He sees it is not too low to handicap the department but that it will require care to keep within it, and he does keep within it. If there is no figure set for his department's expenses, they will surely creep up. If no one is watching expenses very closely, clerks ask for various things they do not particularly need and, year by year, the department's expenses increase. The budget gives everyone something definite to attain—not easy, but attainable.

The next executive concerned in the budget is the Sales Manager. The budget gives him his sales in quantity and amount by states or any combination of states he may desire, with which he can check in a short time, and thus frees more time for other sales problems. Sales executives are salesmen and not calculating machines, and they are not familiar with the various statistical methods necessary to form a sales budget. Estimates made by the Sales Department are likely to be high. The necessity and advantages of a sales budget to the sales executive are so obvious that it is not worth while to state them further.

The Production Manager takes the budget estimate in quantity and checks against it his monthly production capacity to see whether he has enough machines and men if a good year is expected; or, if the reverse is anticipated, to reduce his force and trim his sails gradually. He is enabled, from the budget, to produce at a much more even curve throughout the year, eliminating many of the peaks and using a smaller force.

Purchase of raw material can be handled much more advantageously as to price when you know in advance what will be required. Forecasting also avoids building up a high inventory of raw material should a slump occur, as it would have been anticipated.

The Treasurer knows in advance how his receipts and disbursements will come, by months, and can do his financing accordingly.

This very briefly outlines forecasting and budgeting at our plant. You will be interested to know how accurate our forecasting has proved to be. For 1924, the percentage of error was as follows: orders received, 5.06; sales revenue, .63; expense, 1.00. For 1925 the percentage of error has been: orders received, 3.21; sales revenue, 2.96; expense, 1.52.

II. By S. L. KEDERSKI

One of the principal characteristics in the present-day economic structure is the instability of business activities from year to year. Instability is manifested not only in general business but likewise, in individual businesses. Business activities are always either increasing or decreasing; they never stand still. Since these conditions in the long run affect profits, because prices are either rising or falling, the changes of business activities are of prime importance to every industry. Therefore, accurate statistical measurements are vitally necessary so that an analysis can be made of these movements, and interpreted.

The most common and the easiest way to analyze business data is to compare superficial data for a current month with the corresponding figures, either for the same month of last year or for the preceding month of the same year. Comparisons between different months of the same year, or between the same months or periods of different years are also sometimes made. These direct comparisons of business data are in most cases likely to lead to more or less inaccurate or misleading conclusions, because of the presence in the unrefined data of two influences, namely, seasonal variations, which affect the accuracy of the comparison of the figures for the current month with those of the preceding month of the same year, and normal growth or long time trend which affects the comparison of the current year with other years.

As an illustration of this point, take, for example, the saw business. The number of orders taken for our Alpha Products for the month of November is reported 15 per cent less than the number in the preceding month of October but 10 per cent greater than the number of orders in the month of November of the preceding year. This comparison with the preceding month does not necessarily show any unfavorable sign for the month of November, because orders for our Alpha Products in November are usually less than those in October as a result of normal seasonal changes. In the comparison of November with the same month of the preceding year, the effect of seasonal influences is mostly eliminated, but no allowance is made for long time growth. Although the orders for Alpha Products are 10 per cent greater than those of the corresponding month of the preceding year, it does not necessarily mean that there is a satisfactory improvement over last year. If the normal annual increment or growth in our Alpha orders chanced to be greater than 10 per cent, the orders in the current November would be unfavorable rather than favorable.

Consequently, when dealing with business data in which the influences of long time trend and seasonal variations are apparent, it is necessary to eliminate the effects of these influences before accurate analysis can be derived. It is the purpose of my talk, gentlemen, to attempt to describe a statistical method whereby the effects of these forces can be entirely eliminated.

The statistical method for analyzing monthly data of business activity which I shall endeavor to explain was originally devised by Professor Warren M. Persons of Harvard University. His method makes it possible to measure the influence of the principal elements which underlie changes in business activity and to disintegrate and examine in detail the effects of any particular group of forces. It is through analysis of various basic industries that we ascertained with some precision the causes of the ups and downs of our industry and on such basis were able to project our curves one year in advance.

In order to compare our industry with those which vitally influence it, it is necessary to reduce the rough or crude figures to a comparable basis. There are four principal elements which appear in practically all data with which analysis has to deal:

A. Cyclical movements.
B. Long time trend.
C. Seasonal variations.
D. Accidental movements.

The cyclical movements are those regular increases and decreases in general business which constitute the business cycle. These movements, which hardly ever occur at equal intervals, are of principal interest to the economist or student of business conditions, but every industry is concerned with the statistical methods which these specialists are developing to isolate and to examine these phases more intelligently.

The long time trend is an increase over a continuous number of years caused by development in magnitude of business, growth in population, etc., or it may be a decrease over a continuous period for similar reasons.

Within the year the intensity of business activities varies with the seasons, because of crop movements, conventional practices of trade, weather changes, and many other influences which relate to the particular season of the year.

The accidental movements include the various casual events which may affect an individual industry, or sometimes the entire business structure. Strikes, wars, new inventions are some of the unforeseen events.

Owing to the fact that conditions such as price changes, war periods, etc., are removed by various methods particularly adapted to each individual case, I shall dwell only on the elimination of long time trend and seasonal variations, reducing the figures to cyclical and accidental movements.

The long time trend may be determined by fitting a straight line to the annual averages of the monthly items under analysis; in other words, fitting the most probable straight line to the data. From this line can be calculated the average monthly increment. The method used in our study to determine the long time trend is known as the method of least squares, or it may be stated as follows:—the most probable value of a measured quantity is that value which makes the sum of the squares of all the differences between the various observations and the most probable value, a minimum.

In order to obtain the most probable straight line to fit to a set of points, it is necessary to measure some function or functions of a straight line, from which the line desired can be derived. Since a straight line may be represented by an equation "$y = mx + b$," if the most probable value of "m" and "b" is found from given coordinates "x's" and "y's" of the various points, it is but a simple matter to draw the most probable line from these points. The method of deriving the line is based on the principle, as stated before, that the sum of the squares of the differences is a minimum.

There are two methods of arriving at the line of long time trend or normal growth:

1. A long formula (the Harvard method) to find the value of "m," the slope of the line of long time trend, and "b," its "y intercept," as follows:

$$m = \frac{n\Sigma xy - \Sigma x\Sigma y}{n\Sigma x^2 - \Sigma x\Sigma x} \qquad b = \frac{\Sigma x\Sigma x^2 - \Sigma x\Sigma xy}{n\Sigma x^2 - \Sigma x\Sigma x}$$

2. A shorter formula (the American Telephone and Telegraph Company method) derived from the long formula as follows:

$\Sigma x = 0$. (See Table 1.) Then

$$m = \frac{\cancel{n}\Sigma xy - \overset{0}{\cancel{\Sigma x}}\Sigma y}{\cancel{n}\Sigma x^2 - \underset{0}{\cancel{\Sigma x}}\,\underset{0}{\cancel{\Sigma x}}} = \frac{\Sigma xy}{\Sigma x^2} \text{ or Annual Increment.}$$

$$b = \frac{\overset{0}{\cancel{\Sigma x}}\Sigma x^2 - \overset{0}{\cancel{\Sigma x}}\Sigma xy}{n\Sigma x^2 - \underset{0}{\cancel{\Sigma x}}\,\underset{0}{\cancel{\Sigma x}}} = \frac{0}{n\Sigma x^2} = 0$$

∴ The short method

$$\text{Midpoint} = \frac{\Sigma y}{n}$$

$$\text{Annual Increment} = \frac{\Sigma xy}{\Sigma x^2} \quad \text{Odd number of years.}$$

$$= \left.\frac{\frac{\Sigma xy}{\Sigma x^2}}{2}\right\} \text{Even number of years.}$$

$$\text{Monthly Increment} = \frac{\frac{\Sigma xy}{\Sigma x^2}}{12} \quad \text{or} \quad \frac{\text{A. I.}}{12}$$

I shall now endeavor to explain in detail how we use this short method to determine the long time trend of our business. The first problem is to select a period of years which will characterize the growth of the company. The period considered should be no shorter than a business cycle, so that unusual influences of cyclical changes may be equally weighted, and should begin and end with the same oscillation of the business cycle.

After selecting a period, the first move is to list the annual averages of monthly items by years in a column "Y," as shown in Table 1. The midyear of the period of time in the study is found and the distance from the midpoint of each year from this point is placed in column "X." If the number of years in the study is odd, these distances of the midpoint of each year from the midyear are measured in units of one year. On the other hand, if the number of years is even, the distances are measured in units of half years (see Table 2). Likewise, all those years preceding the midyear in column "X" are given minus signs and those following, plus signs. The square of these "X" items is recorded in column "X²." The midpoint of the line of long time trend in column "Y," is found by dividing the sum of average monthly items in column "Y" by the number of years under analysis. The annual increment, that is, the amount by which the line of long time trend increases from year to year, is the quotient of the sum of the "XY" items, taking into consideration the plus and minus signs, divided by the sum of "X²" items when the years are odd. When the years are even, the annual increment is found by dividing the sum of "XY" items by ½ of the sum of "X²" items, as previously explained. The monthly increment is 1/12 of the annual increment.

Table No. 1

Alpha Products—Odd Number of Years

Year	*Dozens (y)*	x	x^2	xy	*Trend*
1912	27,350	–6	36	–164,100	24,361.7
1913	26,150	–5	25	–130,750	24,819.4
1914	21,600	–4	16	– 86,400	25,277.1
1915	24,000	–3	9	– 72,000	25,734.8
1916	26,850	–2	4	– 53,700	26,192.5
1917	25,600	–1	1	– 25,600	26,650.2
1918	26,350	0	0	0	27,107.9
1919	32,950	1	1	32,950	27,565.6
1920	27,400	2	4	54,800	28,023.3
1921	19,100	3	9	57,300	28,481.0
1922	32,800	4	16	131,200	28,938.7
1923	35,400	5	25	177,000	29,396.4
1924	27,100	6	36	162,600	29,854.1
TOTAL	352,650	0	182	83,300	

$$\text{Midpoint} = \frac{\Sigma y}{n} = \frac{352{,}650}{13} = 27{,}127$$

$$\text{Annual Increment} = \frac{\Sigma xy}{\Sigma x^2} = \frac{83{,}300}{182} = 457.7$$

$$\text{Monthly Increment} = \frac{\text{A. I.}}{12} = \frac{457.7}{12} = 38.1$$

The next step is to find the monthly periods for the ordinates of the long time trend. For an odd number of years, the midpoint will fall between June and July of the middle year. Conversely, for an even number of years the midpoint will fall between December and January of the middle years. By subtracting ½ of the monthly increment from the midyear, the trend ordinate for June of the middle year is found. To find June trend ordinate for years preceding the midyear, subtract successively the annual increment from June ordinate of the middle year, then add the annual increment successively to get the June trend for following years. Having found the June ordinate for each year, fill in the ordinates for the remaining months by adding the monthly increment successively to the already found ordinates. Figure 2 shows actual monthly plottings of Alpha Products revealing the line of long time trend.

Table No. 2

Alpha Products—Even Number of Years

Year	*Dozens (y)*	x	x^2	xy	*Trend*
1912	27,350	–13	169	–355,550	24,593.9
1913	26,150	–11	121	–287,650	25,047.1
1914	21,600	– 9	81	–194,400	25,500.3
1915	24,000	– 7	49	–168,000	25,953.5
1916	26,850	– 5	25	–134,250	26,406.7
1917	25,600	– 3	9	– 76,800	26,859.9
1918	26,350	– 1	1	– 26,350	27,313.1
1919	32,950	1	1	32,950	27,766.3
1920	27,400	3	9	82,200	28,219.5
1921	19,100	5	25	95,500	28,672.7
1922	32,800	7	49	229,600	29,125.9
1923	35,400	9	81	318,600	29,579.1
1924	27,100	11	121	298,100	30,032.3
1925	30,000	13	169	339,000	30,485.5
TOTAL	382,650	0	910	203,950	

$$\text{Midpoint} = \frac{\Sigma y}{n} = \frac{382{,}650}{14} = 27{,}332$$

$$\text{Annual Increment} = \frac{\Sigma xy}{\frac{(\Sigma x^2)}{(2)}} = \frac{203{,}950}{\frac{910}{2}} = 453.2$$

$$\text{Monthly Increment} = \frac{\text{A. I.}}{12} = \frac{453.2}{12} = 37.8$$

There are two ways of arriving at seasonal variations. One method is called Macaulay's or Federal Reserve and another is Persons' Link Relative method. The former method operates best with figures which are a widely fluctuating series over a period of years. The latter method, which is equally good, seems to depend for accuracy on either more moderate fluctuations or a much longer period of years. In an industry similar to ours, it is felt that the fluctuations vary to a great extent during the course of the year. We have used Macaulay's method and it has proved to be the best for us.

Monthly Plottings of Alpha Orders Showing Long Time Trend

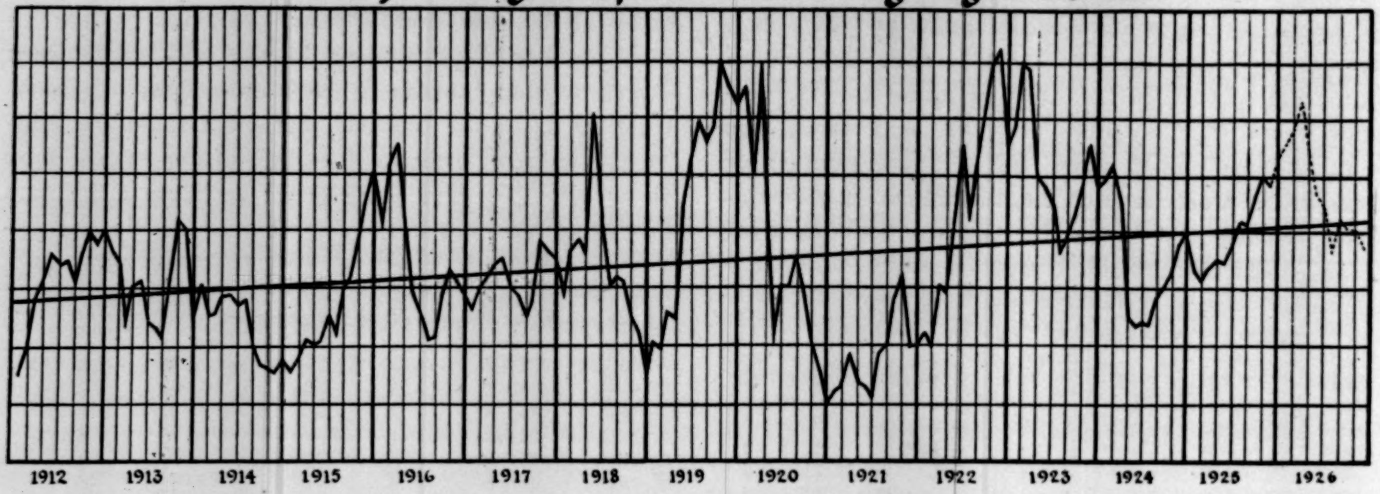


Figure 2

Before applying Macaulay's method in arriving at seasonal indices, it is necessary to take the monthly data under analysis and smooth it out, using a year's moving average to accomplish this purpose. (I shall say a few words later on in this talk about the twelve months moving average and its uses.) After the twelve months moving average, centered, is determined, the next step is to find what per cent the actual figures bear to the twelve months moving average, or the deviation of the trend. After this is done for a period of years, a reliable index of the average seasonal variations is determined. By taking all the deviations for the period considered in a study, a median is found. When the monthly per cent figures are added they will total 1,200 or 12 times the average month of the year as 100 per cent. If the figures fail to add to 1,200, slight adjustments are made.

Having determined the line of long time trend and seasonal variations, the next move is to eliminate their influences. By finding the ratio of the actual figures for each month to the corresponding ordinates of the long time trend, we eliminate the long time movements. By subtracting the seasonal indices from the percentages of trend, we secure a resulting series of positive and negative percentages free from long time trend and seasonal movements. Before we can find the relation or correlation of any series, they must be converted into some standard unit.

The standard deviation is a measure of dispersion of any data. If a set of values is centered about the arithmetic mean, the standard deviation will be small. As the values spread away from the arithmetic mean, the standard deviation will increase.

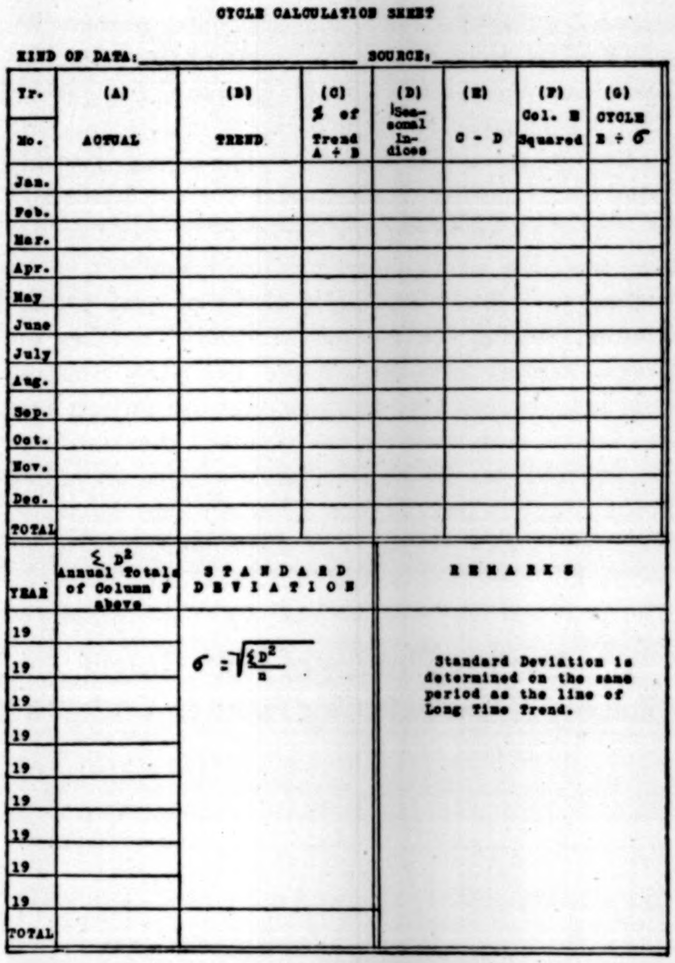
To find the standard deviation, square each percentage deviation, divide the sum of these squares by the number of months in series and extract the square root of the result. Divide each deviation, which corresponds to the arithmetic mean, by the standard deviation and we get the resulting cycles comparable to other curves. Figure 3 is the form on which this computation is rendered step by step.

Following the same line of procedure, we reduced the figures of other lines of industry to a comparable basis. In comparing our curves with other indices of trend such as the Harvard Business Curve, Manufacturing Production Index, Total Contracts Awarded, Real Estate Transactions, Lumber, Speculation and some others, we found that we either led by six months or ran in phase.

Briefly, to find out how we determined our average monthly lead or lag we applied Pearson's Coefficient of Correlation formula which is—

$$r = \frac{\Sigma xy}{n^{\sigma}1^{\sigma}2} \,/\, {}^{\sigma}1^{\sigma}2 = \frac{\Sigma xy}{n}$$

When r = the degree of correlation.
x = the First Business Variable. (Cycles)
y = the Second Business Variable. (Cycles)
Σxy = algebraic summation of the product of x and y
n = number of items.
${}^{\sigma}1$ = Standard Deviation of the First Variable.
${}^{\sigma}2$ = Standard Deviation of the Second Variable.
± 1 = Perfect Correlation.



CYCLE CALCULATION SHEET

KIND OF DATA:____________________ SOURCE:____________________

Yr. No.	(A) ACTUAL	(B) TREND	(C) % of Trend A ÷ B	(D) Seasonal Indices	(E) C - D	(F) Col. E Squared	(G) CYCLE E ÷ σ
Jan.							
Feb.							
Mar.							
Apr.							
May							
June							
July							
Aug.							
Sep.							
Oct.							
Nov.							
Dec.							
TOTAL							

YEAR	ΣD^2 Annual Totals of Column F above	STANDARD DEVIATION	REMARKS
19			
19		$\sigma = \sqrt{\frac{\Sigma D^2}{n}}$	Standard Deviation is determined on the same period as the line of Long Time Trend.
19			
19			
19			
19			
19			
19			
19			
TOTAL			

Figure 3

Whenever two different variables are compared and the movements of one compare with the oscillations of the other, the correlation is good, providing the coefficient falls above .5. Anything below .5 shows a very poor relationship. There are times when it is difficult to tell from general observation of curves whether one variable leads in movements for a given period or whether it lags. In other words, if there is a drop in general business conditions for a certain month of the year, in what month can we expect a corresponding drop in our own business? This can easily be determined by Pearson's formula which is applicable to any business factors.

After a close study of external cycles which we thought related to our business, we found that some business curves deviated more violently from the normal than our own cycle, while some were less violent. Some showed a quicker recovery than our "B" cycle. In general, however, the resemblance of all the external cycles which influence the demand for our products was very prominent. The next thought was to add all these external cycles and average them in a general demand curve, a general business curve reflecting the demand for our products. The result, when all the component cycles received equal weighting, showed a tendency to smooth out some of the erratic movements of the individual curves. But upon closer observation of this average curve, we found that if we gave extra weight to some of the cycles, some of the more erratic points could be eliminated entirely. Therefore, we recalculated the average demand cycle and laid greater stress on the most important ones. The resulting curve showed a better correlation than the first. Figure 4 shows the comparison of average demand curve with our Alpha Products.

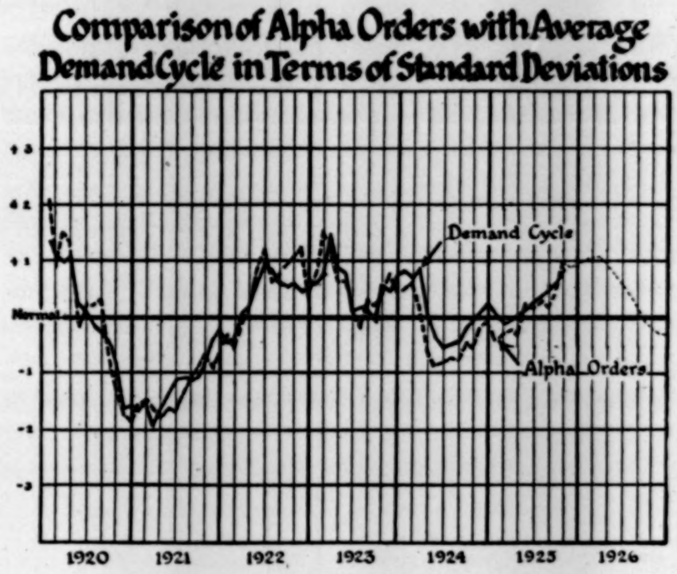


Figure 4

This average demand cycle does not run ahead of our own cycle, but the advantage derived from it is very great. We are manufacturers and must produce against orders received. To produce for the future markets and have an effective inventory control, we must make estimates definitive for the Production Department, i.e., in quantity terms. According to our average demand cycle, changes in business are always taking place. Although our own cycle shows changes at the same time as the average demand cycle, we cannot forecast unless the average demand cycle is indicating the same swing as our own cycle. We cannot analyze our own cycle, and from it alone we cannot measure the causes of the movements. Therefore, this average demand cycle keeps us down to earth, permitting us to go ahead according to its direction.

Since the advent of the Harvard Economic Service and a few other professional Statistical Service Bureaus, we can generally tell in which direction general business is moving. Having this knowledge we can very easily project the average demand cycle one year in advance. Some business men would feel reluctant to hazard an attempt to forecast their own business which is running with or ahead of the security market. This chance is a very essential element of any industry. Production must be against future needs, consequently it is up to the management to solve the probable market. It cannot be left to the storeroom foreman who lacks keen judgment of the future business outlook, but depends upon immediate past requirements which, in our business, are sometimes misleading. Therefore, assuming that our "B" curve will follow the same course as the average demand cycle,[2] it remains only to translate the estimated monthly items which are still, in terms of Standard Deviation, above and below normal, back into the units in which the series was originally expressed. The cycles are converted to percentage deviation by multiplying them by the standard deviation. The percentage deviation for each month is added to the appropriate seasonal index. Each of these percentages is then multiplied by the corresponding ordinate of the trend line. The resulting figures are the tentative estimates of probable course for next year. The kernel of this method lies in the accuracy with which you can forecast general business conditions.

I have devoted most of my discussion to the correlation method which primarily depends upon a long period of years. I want to say a few words, before I close, on the measurement of short time series. It seems to me that many of us would like to measure our data since the close of the World War. In short series of data, we are generally interested in the seasonal variations since a period must be at least eight or ten years to point out any long time tendencies or growth.

Our first task to eliminate seasonal movements in a short series is to work out a twelve months moving average, centrally plotted, and determine the seasonal variation by Macaulay's method, as I have previously explained. The twelve months moving average should smooth out the erratic movements and be free of seasonal influences and other accidental movements, which might occur during the course of the year. The year's moving average should represent the general swing of monthly items in so far as movements and turning points are concerned. The actual monthly areas which cut the year's moving average line might be shaded to bring out the variation of monthly figures from the year's moving average plottings. (See Figure 5.) After making a study of past performances showing the number of months it takes the twelve months moving average curve to rise and then fall, you can very easily project the curve a year in advance, with some degree of surety, checking your results, of course, with your knowledge of prevailing business conditions. These plottings can be translated to monthly estimates by multiplying each figure by the appropriate seasonal variations for the group.

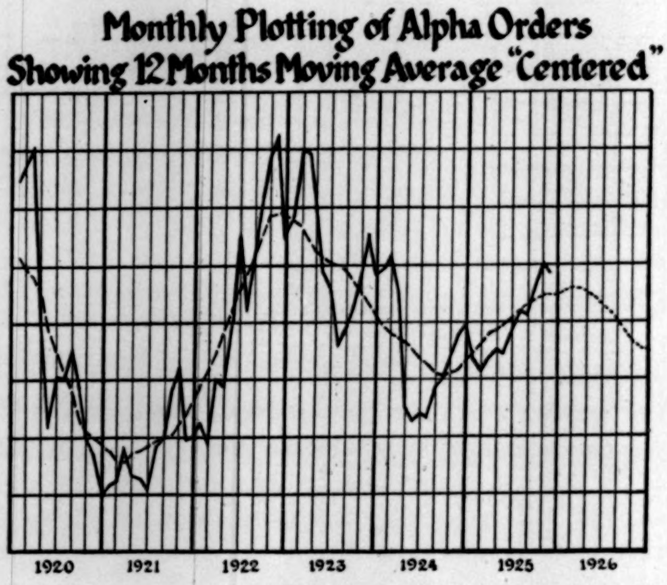

Monthly Plotting of Alpha Orders
Showing 12 Months Moving Average "Centered"

Figure 5

Another method which will usually show the trend of your own business is Mr. Joseph Barber's "Year Ago Curve," as shown on Figure 6. This curve can be easily projected into the future, thereby making a check on the other tentative estimates. Usually, a "Year Ago Curve" must be smoothed out by either a three months moving average or a five months moving average. From the resulting moving monthly average, a per cent increase of each month over the corresponding month of the previous year is found. Although this method is not statistically precise, it eliminates the seasonal variations and, to a considerable degree, the normal growth. The percentages

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[2] The average demand cycle is a composite index representing the purchasing power which creates the demand for our products.

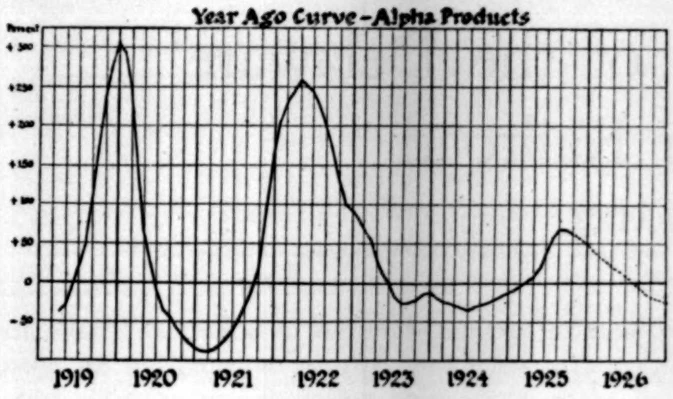

Figure 6

show only the up and down swings of business—a fairly smooth curve. After projecting the curve forward, the monthly items which show the per cent increase or decrease of each month over the corresponding month of the previous year are read off. The tentative estimates of the probable course for the following year are found by increasing or decreasing last year's monthly items by these percentages.

Forecasting in any industry which shows a relative stability when compared with general business is done in a different manner. A public utility, whether a telephone or electric light and power industry, depends, to a large extent, upon the normal developments in the uses of the telephone and electric current. On such a basis, it is very easy to develop a normal per cent increase for each year. Of course, a check can be made on this method by developing a reliable average revenue per unit, both for the telephone industry and the electric power and light industry.

In closing, I want to say that the statistical technique which I have, in part, elaborated on, is but a device to help men of keen judgment to draw their conclusions. Statistical methods, including charts and formulas, can do more harm than good in the hands of a person with no knowledge of economics and scientific management. But, nevertheless, statistical methods are indispensable to a good executive and are gaining more prominence every day. While these statistical methods of forecasting have been so far successfully operated in the Henry Disston & Sons Co., they may very easily be modified to meet the requirements of any business man.

THE excerpt below is from "The Dilemma of Thrift" in the *Atlantic Monthly,* April, 1926, page 543. The authors of this article, Wm. T. Foster and Waddill Catchings, are joint authors of "Profits," a volume in the Pollak Foundation Series which will be reviewed in a forthcoming issue of the BULLETIN. A prize of $5000 is offered for the best adverse criticism of this book, submitted to the **Pollak Foundation, Newton 58, Mass., before January 1, 1927.**

Progress toward greater total production and resultant higher standards of living is retarded because consumer buying does not keep pace with production. Consumer buying lags behind for two reasons: first, because, on account of corporate savings, industry does not disburse to consumers enough money to buy the goods produced, without a fall in the price-level; second, because consumers, under the necessity of saving, cannot spend even as much money as they receive. Partly on account of these savings, there is not an even flow of money from producer to consumer, and from consumer back to producer. Furthermore, the savings of corporations and individuals are not used to purchase the goods already in the markets, but to bring about the production of more goods. The expansion of the volume of money does not fully make up the deficit, for money is expanded mainly to facilitate production and the product must be sold to consumers for more money than the expansion has provided. Consequently we make progress only while we are filling the shelves with goods which must either remain on the shelves as stock in trade or be sold at a loss, and while we are building more industrial equipment than we can use. Inadequacy of consumer income is, therefore, the main reason, though not the only reason, why we do not long continue to produce the wealth which natural resources, capital facilities, improvements in the arts, and the self-interest of employers and employees would otherwise enable us to produce. Chiefly because of shortage of consumer demand, both capital and labor restrict output, and nations engage in those struggles for outside markets and spheres of commercial influence which are the chief causes of war.

Personnel Activities of the Delaware and Hudson Railroad[1]

By **W. W. BATES**

Assistant to General Manager for Personnel, Delaware and Hudson Company, Albany

SOON after his appointment as President of the Delaware and Hudson Company, Mr. L. F. Loree's attention was attracted to the numerous and growing misunderstandings between employees and the supervisory forces. With the thought of developing the underlying causes, he directed the selection of a man whose sole duty would be to make a complete study of employment relations. From this beginning, something over ten years ago, this activity has grown to include a force of thirty people, now recognized as a Personnel Department but correlated to every department on the railroad.

Operating efficiency is rather exacting in its demands upon the supervisory forces and affords but little time for intimate study of the personnel problem. The Personnel Department aims to assist department heads in the administration of employees' problems. This activity is conducted in such a manner as to avoid interference or usurpation of the prerogative of the supervisory heads. Emotionalism bears no part in the personnel activities employed on the Delaware and Hudson Railroad. The motive has been neither a humanitarian impulse nor a selfish attempt to increase efficiency beyond individual capacity but rather to establish sound basic principles of interrelationship between management and labor which could be applied to any successful enterprise.

The fact that this movement, insofar as our company is concerned, was started well on its way before the War activities in this country and throughout such activities continued policies previously laid down, naturally eliminates us from the mushroom growth of so-called personnel activities as a result of the War.

In handling this problem, conservatism has been the prevailing thought and we have been careful not to undertake any job that could not be finished. Innumerable schemes designed to attract and hold the interest of employees may be initiated but all must fail of their objective unless proper machinery has been set up to handle disputed matters, in a fair and impartial manner, and to a conclusion.

Naturally the grouping of any considerable number of individuals in any industry requires the promulgation of certain rules for the government of all concerned. This is particularly true of all railroads. The establishment of rules implies necessity for discipline. Mr. Loree in his book on "Railroad Freight Transportation" covers the subject concisely:

> A corporation of the first magnitude and of the character of a railroad rests its hope of successful operation very largely upon organization, discipline, and continuity of employment. At all times forms of organizations have swung between the extremes of great centralization and great decentralization, in the railroad service between the departmental and the divisional organization. It must always be kept in mind that discipline contemplates two attitudes: the person disciplined may be a disciple, a learner; or he may be one subjected to punishment. Both relations contemplate knowledge, capacity, fair dealing, and resolute courage on the part of the officer charged with administering discipline. There is no more important function to discharge, nor one to which more care and thought should be given.
>
> There must be such continuity of service as will insure a reasonable hope of advancement; and for the entire body a continuous policy; a history personal in its character; and an esprit de corps founded on mutual experience, respect, and confidence.

The Board of Disciplining Officers

Discipline as well as grievances of any character if not justly and promptly handled provoke and irritate the employees. Therefore our first concern was to establish a plan whereby employees could have easy access to an appeal or advisory body to whom they could carry their troubles. The first move in this direction was the creation of what was known as the "Superintendents' Board" in the Transportation Department. This Board consisted of the Superintendents of four divisions to whom all matters on appeal were referred. This Board was designed primarily to establish uniformity in dealing with matters of a disciplinary nature; during its existence it dealt successfully with all problems submitted to it.

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[1] Abstract of a paper presented at a meeting of the Central New York Section of the Taylor Society, Syracuse, October 9, 1925, and at a joint meeting of the Industrial Relations Association, Elmira District and the New York Southern Tier Section of the Taylor Society, Elmira, December 14, 1925.

In May, 1920, a new body known as the Board of Disciplining Officers of the Delaware and Hudson Company was created. This Board was appointed to consider discipline, wages, interpretations of agreements, and other matters pertaining to labor, its scope to cover all classes of employees. The Board consists of seven officers of the grade of Superintendent with a non-voting Chairman and Secretary. Members of this Board are representative of the major departments on the railroad.

Organization representatives or individual employees are privileged to present grievances and complaints of any nature affecting the employees. However, before presentation to this Board, all matters must have been presented to the head of the department interested. In reviewing cases every effort is made to establish the facts before decision is rendered.

In matters of discipline the unanimous vote of all members present is required while other matters coming within the jurisdiction of the Board require but a three-quarters vote of all members present.

Unlike some railroads, as well as other industry, the Delaware and Hudson Company has never felt that the management could properly divide its responsibility in matters of management or discipline. Therefore, we have never given consideration to joint adjustment boards or similar boards divided between employees and management.

The important feature of our kind of an organization is the thorough and painstaking effort that is made to analyze clearly and establish the facts in all matters presented. It is generally acknowledged that with the establishment of facts, proper decisions are not difficult.

All decisions of the Board are reviewable by the Vice-President and General Manager and if the employee is dissatisfied with the decision rendered by the Board, his case may be appealed to the Vice-President and General Manager.

The question may arise as to the apparent partiality of a Board entirely made up of officers. As a matter of fact, in hearing appeals of a disciplinary nature but one member of this Board would be affected and in the presentation of the case the other members, unaware of the circumstances or facts, are in a position to weigh the evidence presented and reach a decision which rarely fails to be unanimous. Thus far no question has been raised as to the unfairness of this manner of dealing with employee problems.

The best result of this aftermath of appeals is the fact that during the past year the Vice-President and General Manager and this Board have settled every conceivable grievance that has come up with the exception of a few cases that are now outstanding awaiting adjustment. These, in the main, are technical cases in most instances involving a day's pay, which in no sense affect any large number of employees.

The handling of such matters on the Delaware and Hudson Railroad has been so effective that the Vice-President and General Manager will rarely deal with appeal cases in excess of two or three times per year; it is doubtful if you will find an executive officer of any other railroad who is required to give so little time to this feature of administration.

In the old days neglect in correcting bad practices generally resulted in proposed rules to eliminate such practices. It has been our experience that the prompt adjustment of minor grievances tends to create good feeling and avoids general dissatisfaction. We maintain an "Open Door" policy and any employee may call attention to any irregularity; if the information warrants action, immediate steps are taken to adjust the difficulty. Employees are not restricted in discussing matters with representatives of the Personnel Department. However, the employee is advised in all cases to take the matter first to his immediate supervisor. The representatives of the Personnel Department are fully aware of the importance of giving attention to the small things and no opportunity is overlooked to advance the interests of the employee in establishing that family relationship which ought to exist in any industry. All these activities, however, are conducted so as to avoid any clashing of authority.

The thorough manner in which matters in dispute were met has eliminated unfavorable misunderstanding, created confidence, and reduced almost to a minimum causes of dissatisfaction with working conditions. It has also evidenced the purpose of the management to deal fairly with the employee and has inspired a reciprocal attitude. Having established a certain degree of confidence, our next move was for a better knowledge of our employees. The establishment of a central service record bureau which would furnish information regarding the individual employee and arrangements for keeping such data current were deemed of major importance.

Personnel Records

The urgent demand for production unfortunately gives but little opportunity to the average executive or department head to know personally very many of the employees. The record we maintain furnishes information with reference to age, dependents, and other personal data together with record of service, classification, and rate of pay. Provision is also made to record promotions, discipline, meritorious service, etc. Thus when the name of any employee comes before the management either for advancement, change in rate of pay, or other reason, the complete record of such employee is available for inspection.

Supplementing our scheme of maintaining a comprehensive record of individual employees, we have for the past two years engaged in a more intimate study of the personnel through a man and job analysis. Thus far, this study has been confined to the clerical forces of the railroad and has produced some very interesting and useful information.

Accompanying other data showing operating performances placed regularly before the Vice-President and General Manager are reports showing the activity of the Personnel Department, including labor turnover and discipline by departments, insurance status, pensioners, new and deceased, cases handled by the Board of Disciplining Officers and how disposed of, together with miscellaneous information covering the various phases of work of this department. The Vice-President and General Manager is thus able to keep informed in this as well as other features of operation. Without the service of the record bureau, much of this information would not be available.

Care in the selection of new employees is being given its proper place in the present-day method of dealing with personnel. Very frequently in certain departments we hear of cases where old employees are criticized because they cannot meet the demands made upon them and are often run around in promotions. In many instances the employee is not to blame but rather the fault is with the management. Failure to adopt selective methods in former years frequently resulted in hiring for a clerk a man who in all probability would have made a successful bricklayer.

The approval of applications for employment is entirely in the hands of the Personnel Department. Applicants are permitted to enter the service on a temporary employment basis until their application is either approved or rejected. The selective process includes observation for a certain period after selection.

Labor Turnover

Turnover with us covers a period of two years although the greatest turnover occurs in the first six months. It is during the period between six months and two years that both parties come to an understanding as to future relations.

The Delaware and Hudson Railroad is one of the oldest railroads in this country and naturally we have a goodly number of old employees as well as sons and grandsons of other old timers.

With a total force of between thirteen and fourteen thousand employees, better than sixty per cent have been with us in excess of five years. Something over five hundred have been in service forty years or more, one active conductor having been in service for sixty years. Fortunate indeed is that industry that can boast of a large group of long service employees. Their influence contributes to the efforts put forth in stabilizing employee relations.

It may be assumed that most of our activities are directed toward the employee who has been in service several years but our interest in the new employee is just as keen. We realize that after the new man has adjusted himself to the new environment and has given evidence of a desire to remain with us his value increases every day.

Mr. Loree's book refers to the "job jumper" as follows:

> It is the history of people of low mentality that they are constantly changing jobs, and in the railroad business their early elimination is most desirable. Those kept should be encouraged in self-control, surrounded by a favorable environment, and given careful training while subjected to constant supervision.

Educational and Social Activities

Our study of the personnel problem develops numerous ways and means of interesting the employee not only in his job but in his relations with other employees, including subordinate officials. The natural impulse toward athletics, theatricals, and social activities is encouraged in a definite and most effective manner. Each year every facility to get together under these various activities is afforded employees and their families. Talent for almost any enterprise of this character is available in our own ranks and many of the events have attracted unusual attention.

Encouragement is given to the forming of associations of various kinds by groups. These associations having for their object educational, social, and fraternal advantages have aided materially in bringing our employees into closer relationship. The following associations are typical:

The Delaware and Hudson Veterans' Association, (1,200);

The Delaware and Hudson Athletic Association;

The Delaware and Hudson Freight and Ticket Agents' Association;

The Delaware and Hudson Car Department Supervisors' Association. (There are three divisional associations, also, that report to the general association);

Mechanical Supervisors' Association of the Pennsylvania Division. (Motive Power);

Supervisors' Association of the Motive Power Department, Saratoga and Champlain Division;

Supervisors' Association, Motive Power Department, Susquehanna Division;

Colonie Motive Power Department Band;

The Delaware and Hudson Police Association;

Rifle Clubs in the Police Department;

The Delaware and Hudson Company Shop Craft Associations;

Bridge and Building Mechanics' Association;

Maintenance of Way Foremen's Association;

Delaware and Hudson Glee Club; and

Delaware and Hudson Bowling League.

Of material assistance in the educational and social campaign is the publication of a semi-monthly magazine, the *Bulletin;* a weekly sheet known as *Craftwise,* published in the interests of the Crafts; and an Italian Bulletin printed in Italian.

Naturally, in any definite program involving personnel activities, a Safety First organization is of the utmost importance. The Delaware and Hudson Company has a most effective Safety First organization which consists of a Superintendent of Safety and a limited staff, who have built up an organization which has attracted considerable attention. In many respects the results have been unprecedented.

Dr. Robert L. Browning of the American Red Cross visited our principal shops at Colonie recently and stated that during the past year he had visited practically every large railroad shop in thirty-two states and nowhere had he found a record that excelled or even equalled that held at Colonie. "It is," he stated, "the safest shop in America." At this particular time we are now approaching the end of a two year period during which no one of the Car Department employees has suffered a reportable injury. Much of the Safety First activity can be accredited to the employees' sustained interest in this movement.

Group Insurance

After establishing confidence through fair and impartial dealing and through awakening the social or family spirit of the employee, Mr. Loree introduced what might be designated as the most unique and comprehensive plan of group insurance in effect anywhere in this country, providing against the five major hazards of life which are the cause of apprehension and anxiety to the workman—death, accident, sickness, unemployment, and superannuation. On January 1, 1922, the following plan was announced:

Life Insurance. Each employee in the service of the company six months or more was given a life insurance policy without cost and without medical examination—$500.00 life insurance, with total and permanent disability provision, to employees with two years or more of service, $250.00 to those with six months but less than two years of service.

On April 1, 1922, the employees were given an opportunity to secure additional insurance, under the following contributory plan: An employee in the service six months but less than two years might subscribe for $250.00 additional insurance, making a total coverage of $500.00, paying a portion of the premium on the additional insurance; employees two years or more in the service were given several options—first, $500.00 additional insurance with a further option of an additional amount limited to the average annual compensation for the preceding two years, but not in any case in excess of $5,000.00. The company assumed a portion of the cost of the additional insurance, providing protection at a cost not obtainable elsewhere.

Health and Accident Insurance. A policy covering loss of work from sickness is provided for, with benefits of $15.00 a week for a period of twenty-six weeks beginning with the eighth day of incapacity. A policy covering loss of work by accident, exclusive of injuries covered by workmen's compensation laws, is provided with benefits of $15.00 a week for a period of twenty-six weeks beginning with the eighth day of incapacity. The total cost of this insurance is paid by the employee.

Death and Dismemberment Insurance. Further, employees are able to obtain accident insurance covering death or dismemberment from any accidental cause, including accidents covered by workmen's compensation laws, the total of such insurance not to exceed the amount of life insurance carried under the plan, thus in effect giving the double indemnity feature.

Unemployment Insurance. Another provision is made under the plan to insure against unemployment resulting from dismissal for any cause, and providing payments of $15.00 a week ($10.00 for employees whose average annual wages during the preceding two years did not exceed $1,000.00), for six weeks or for so much of that time as the employee may be unable to find employment, provided he has subscribed for and contributed toward the cost of at least two of the three forms of insurance. The total cost is borne by the company.

Pensions. The company proposes to continue its present system of pensions, under which, in its discretion, pensions are granted to employees who have been in the service of the company twenty-five years or more and have reached the age of seventy, or who, upon reaching the age of sixty-five, are incapacitated for service. Under this plan the monthly sum paid the pensioned employee is equal to one per cent of his average monthly earnings during his preceding ten years' service, multiplied by the number of years of service with the company.

Of these five forms of insurance, the cost of two is borne wholly by the company, two by the employee, one is shared by both.

During the three years since the announcement of the plan, the following benefits have been paid:

Claims	*Character of Benefits*	*Amount*
353	Life	$417,412.77
1,470	Health	154,529.46
158	Accident	11,726.35
18	Accidental Death and Dismemberment	29,100.00
19	Total and Permanent Disability	7,582.27
87	Unemployment	6,375.66
277 (Avg.)	Pensions	306,360.15
	Total	$933,086.66

During the year 1924, of 159 employees who died, 123 were eligible and insured under the group policy. For the entire period during which the insurance has been in effect an average death claim of $1,182.51 has been paid. Sick claims averaged $105.12; accidents $77.73; Accidental Death and Dismemberment $1,616.66; Total and Permanent Disability $399.06; Unemployment $73.28; Average Annual pension allowance $449.21. The latest figures as of September 30, 1925, show a total of $822,514.30 having been paid employees and their families since the insurance was placed in effect.

Railroad employees have the same interest in protecting their families as has the average citizen, but such coverage is limited by ability to pay its cost. Group Insurance affords additional protection at an unusually low rate. Prior to the introduction of group insurance, comparatively few employees carried accident insurance, while sickness insurance was almost unknown. It must be apparent, in the distribution to families of the large sum of money mentioned above in 2,105 individual cases, that group insurance has been of inestimable benefit in aiding employees and their families in meeting expenses in the case of death, injury or sickness.

By the contributory features of our plan, thrift has been taught. The protection afforded has brought a sense of security and ease of mind to the employee unknown before and judging from the expressed appreciation of the plan, the favorable reaction in the strengthening of morale is unquestionable.

When the plan was first introduced some of the employees declined to subscribe and in some instances were active in their opposition. This feeling has since disappeared and many employees who failed to take advantage of the opportunity to secure the insurance without medical examination have applied for the insurance, taking the necessary medical examination. The success of the plan in operation has not only awakened interest in the protection afforded but has resulted in increasing the number of employees subscribing. On September 28, 1925, of the 12,576 employees eligible for insurance, 11,417, or 90.7 per cent of the total were insured under the contributory provisions of the plan.

Unemployment Insurance

The whole subject of Unemployment Insurance is largely in an experimental stage in this country. It is obvious that Unemployment Insurance as applied by the Delaware and Hudson Company cannot be compared with the schemes in effect elsewhere since in each case conditions are as varied as the countries or the industries themselves.

This form of protection to the individual employees lends itself to the group plan in effect on the Delaware and Hudson Railroad in a most effective way. In our business there is a continuity of employment rarely broken in the class of employees eligible for Unemployment Insurance. Railroad business fluctuates but unless unusual depression prevails, railroad employment is fairly constant.

It has also been our experience that most of the unsettledness in the minds of the employees develops within the first two years. After an employee has been in service for two years generally he or she has decided to continue in the railroad service but even with this term of service, unemployment coverage does not apply except on the initiative of the employee who has been a voluntary contributor toward the cost of at least two of the three forms of insurance. Out of a total of 13,000 employees our latest check shows approximately 8,900 eligible for this form of insurance but during the three years and five months this insurance has been in effect, we have paid but 103 claims. Thus it will be seen that the payment of unemployment insurance is somewhat restricted.

While Unemployment Insurance as applied by the Delaware and Hudson Company is a new venture it has materially aided in the stabilization of employment, aside from the benefits enjoyed by the individual who may be so unfortunate as to be temporarily unemployed.

In connection with the subject of stabilization, reference should be made to the basic day provisions and our relations with the shop crafts. Mr. Loree, referring to this subject, has written:

> The agitation for the eight hour day in the industrial field was based largely upon the divisability of the 24 hours into three equal periods, and the effectiveness of the slogan, "eight hours for work, eight hours for play, and eight hours for sleep." The claim was furthermore confidently made that production per man under the eight hour schedule would be greater than under a ten-hour schedule. No investigation was made to develop the facts in this latter regard, nor to ascertain whether the world could support itself on such a basis. The world was steadily improving its condition under a work day of ten hours. Manifestly, life could not be maintained were no work done. There must necessarily be a point beyond which, were hours of work to be further reduced, we should inevitably go backward. Nor was any consideration given to the effect created by so glaring a difference between the conditions of industrial and agricultural labor. In many cases the real incentive was not to shorten the day to eight hours, but to maintain a longer day and enjoy the benefit of punitive overtime after eight hours.
>
> My own feeling is that the spread between the eight hour day and the ten hour day should be utilized for the benefit both of the community and the workman; that when times are hard and men are being thrown out of employment—generally by reduction in forces—it is desirable, as a general rule, before discharging men from service, to reduce the working hours to eight or their equivalent. Even in severe panics seldom does production for a year fall off so much that this margin of 20 per cent would not be sufficient to protect the situation. But this method of distribution of work in hard times to decrease unemployment may easily be carried so far as to bring disastrous results, involving all on the payroll in the calamity of inadequate earnings.

In the re-organization of our shop forces in 1922 we negotiated an agreement covering this particular feature and have in effect the following rule:

> As continuity of employment is of the first importance, a day of from eight to ten hours shall be considered a working day, it being believed that this will largely afford protection against both seasonal and economic fluctuations as follows: The hours of the working day for each point shall be posted by bulletin at each point, and shall be eight hours during slack time and until a day of this length is so bulletined, no reduction in force will be made.
>
> As business improves, the day may be lengthened to nine and ten hours, but no new force shall be added until ten hours is the bulletined working day. Such hours shall, as a rule, be worked continuously.
>
> Under the bulletin arrangement, time paid for is on a pro rata basis up to the tenth hour.

In outlining our activities in dealing with the personnel problem, we are not unmindful of the fact that there probably are many industries conducting work along similar lines.

However, conditions vary as between industries. For instance, it would seem that work of this nature might be carried on in one location with less difficulty than on a railroad covering territory in excess of one thousand miles, with its personnel divided into groups and widely scattered.

Notwithstanding this handicap, we are satisfied that much has been accomplished in the establishment of a reasonably contented personnel and our method of dealing with this problem has been productive of the best possible results, including stabilization of employment.

Success

A Lecture to Young Men Entering Business[1]

By FREDERICK WINSLOW TAYLOR

I WANT to speak to you on success; success for the ordinary man, not success for the genius or the unusual man. I do not doubt that among you there are many geniuses, and those among you who are geniuses will more than likely be a law unto themselves. I should not, however, advise any one very strongly to start out to be a genius. The genius is usually an indirect product, not a direct one. What I have in mind, then, is to try to be of some help to the ordinary, every-day engineer in obtaining success.

The young man, up to the time that he leaves college, is chiefly engaged in absorbing and assimilating knowledge for his own use. The moment he leaves college he begins directly the opposite, namely, using what knowledge he has for the benefit of others.

Up to the time that the young man leaves college practically all those around him have been serving him. His parents have been supporting, guiding and disciplining; his teachers have been helping him to get an education. The moment he leaves college, however, he begins his life's work of serving others.

Now I use this word "serving" advisedly. It gives the exact shade of meaning which I wish to convey. Practically every man engaged in active, useful work is engaged in serving someone else, and this is equally true of the president of the company and the office boy. Everyone is serving someone else.

The work of the young man until he leaves college has been that of getting an education. There are, however, three by-products of this process of getting an education, either of which, for success in life, is more important than the education itself. These by-products are common-sense; character; and integrity.

Let me tell you what I mean by these words. Of course they cannot be completely defined in a few or even in many sentences, but briefly, *common-sense* is the ability to decide as to the relative importance of things,—the ability to select from among the several possible lines of action which lie before you the one act which is best, the one act which will yield the largest return.

Character is the ability to control yourself, body and mind; the ability to do those things which your common-sense tells you you ought to do; the ability above all to do things which are disagreeable, which you do not like. It takes but little character to do difficult things if you like them. It takes a lot of character to do things which are tiresome, monotonous and unpleasant.

By *integrity* I do not mean merely the kind of integrity which will keep a man out of jail. I mean that straightforward honesty of purpose which makes a man truthful, not only to others but with himself; which makes a man high-minded, gives him high aspirations and high ideals.

Now, I wish to emphasize the fact that each of these three by-products counts for far more in success than the more brilliant and interesting qualities of intellect, knowledge and mental attainments.

During the process of getting an education your success has depended mainly upon yourself, and this will, of course, remain true at all times. It is clear, however, that during your life-work of serving other people, your success must also depend to a large extent upon your ability to please the man you are serving, and you will do this by serving him his way, not yours; by doing the things which *he* wants, not the things which *you* want.

For success, then, let me give one simple piece of advice beyond all others. Every day, year in and year out, each man should ask himself, over and over again, two questions. First, "What is the name of the man I am now working for?" and having answered this definitely, then, "What does this man want me to do, right now?" Not, "What ought I to do in the interest of the company that I am working for?" Not, "What are the duties of the position that I am filling?" Not, "What did I agree to do when I came here?" Not, "What should I do for my own best interest?" but, plainly and simply, "What does this man want me to do?"

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[1] This lecture was prepared by Mr. Taylor for presentation to the students of the College of Engineering of the University of Illinois in Urbana, February 18, 1909, though delivered first to students of the College of Engineering of the University of Cincinnati on his way to Illinois. Later it was presented at various other engineering schools. It has never before been published in a form available for general reference, although numerous excerpts may be found in Copley's "Frederick W. Taylor."

Perhaps these two questions sound very much alike, but let me assure you that there is a vast difference between the two. The question, "What does this man want me to do?" implies that you propose leaving this decision to him. The question, "What ought I to do for the interest of the company?" implies that you propose making this decision yourself, and it should be clear to you that if you expect to please the man whom you are serving you must leave this most important decision to him.

Bearing in mind, then, that your success will depend mainly upon your ability to please the man whom you are serving, it becomes of the greatest importance to know exactly what will please him, and I am sure that you will find certain general principles of use in making this decision.

When I was about to begin to serve my apprenticeship, an old gentleman[2] who had been very successful sent for me to come to see him. He lived some 20 or 30 miles away, and said that he had something very important to tell me. What he had to say took but three or four sentences. He said, "If you want success in your work, do what I say. If your employer wants you to start work at 7 o'clock in the morning, always be there at ten minutes before seven. If he wants you to stay until 6 o'clock at night, always stay until ten minutes past six. Now, if you haven't sense enough to know what I mean by this, you haven't sense enough to succeed, anyway."

He also said, "Let me tell you one more thing. Whatever happens, however badly you may be treated, however much you may be abused, never give up your job until you have taken 48 hours to think it over; and if possible don't talk back to the man who is over you until you have time to cool off."

Now, in the first of these recommendations there is a broad and general principle involved which is not altogether apparent on the surface. At least, it took me several years to grasp fully what the old man meant when he said, "If your employer wants you to start work at 7 o'clock in the morning, always be there at ten minutes of seven."

There are two ways of giving orders, and in all cases the young man must use his common-sense and a small amount of brains to decide in which of these two ways the order has been given. The first of these ways is, "Take that chair in your left hand. Carry it over into the corner and lean it against the wall." The second of these ways is, "That chair wants to be put away. Go and do it." Now, when a man tells you precisely and exactly and minutely what he wants you to do, it is because he wants you to do just that, and nothing else. When, however, as is the case in perhaps nine times out of ten, a man gives the second type of order, then he expects you not only to do what he says but perhaps also to do a little better than he says, and in giving the man you are serving a little more than he expects lies more than in anything else the key to rapid success.

Throughout life it is the small, unexpected, unasked-for acts of courtesy and kindness that give especial pleasure. It is the little gift, the small piece of uncalled-for generosity, that charms, makes life worth living—and remember, your employer is no exception to the rest of mankind in his appreciation of this.

Quite a large proportion of young men set out deliberately to do barely enough to satisfy their employer,—in fact, many of them would feel happy to do as little as they can and still satisfy their employer. Another set of men propose to do just what their employer wants. They, however, are at all times exceedingly careful to guard their own rights and not to give a single thing in the way of service that they are not paid for. About one man, however, in twenty takes the real, quick road to success. He makes up his mind deliberately that in all cases he will not only give his employer all that he wants, but that he will surprise him with something unexpected, something beyond what his employer has any right to ask or expect, and it is astonishing how fast this line of action leads to success.

To do this, then, it is perfectly clear that as a foundation the decision of what you are to do must rest in all cases with your employer, and not with yourself. This seems exceedingly simple, and yet most men, if they ever learn it, learn it by having it pounded into them.

Let me tell you how it was pounded into me. I was foreman of a machine shop more than half of the work in which was that of repairing and maintaining the machinery in a large steel works. Of course my chief interest and hope in life was that of doing some great thing for the benefit of the works that I was in. My head was full of wonderful and great projects to simplify the processes, to design new machines, to revolutionize the methods of the whole establishment. It is needless to say that 99 out of 100 of these projects were impracticable, and that very few of them ever came to anything, but I was devoting every minute of my spare time, at home and on Sunday, and entirely too much of my time in the works, to developing these wonderful and great projects. Now the superintendent of the works[3], who had been a warm friend of mine for years, wanted me to keep all of the machines going with the minimum loss of time, and kept telling me this over and over again. I, however, knew much better than he what was for the interests of the works. I did not daily ask myself, "What does this man want me to do?" but I daily told myself just what I ought to be doing. He stood this as long as he could (which was a great deal longer than he ought to have stood it) and finally came into my office one day and swore at me like a pirate. This had never happened before, and I, of course, at once made up my mind that I should get right out; wouldn't stand any such treatment. I, however, remembered my early advice, and waited 48 hours before doing anything. By that time I had very greatly cooled off, but for two or three weeks at regular intervals my friend, the superintendent, repeated this process of damning me up and down hill, until he finally beat it into my dumb head that I was there to serve him, and not to work in the interests of the company according to my own ideas, when these conflicted with his; and from that time forward I made quite rapid progress toward success.

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[2] His uncle, Caleb N. Taylor, president of the Farmer's National Bank of Bristol, Pa. (Copley's Frederick W. Taylor, Vol. I, p. 77.)

What your employer wants is results, not reasons. He wants you to *get there,* and he is not interested in your explanation of why you failed to get there. There is one saying which we have all used since childhood, and which has had no little part in the failure of unsuccessful men. We have all of us said, "I have done the best that I know how; no one could expect any more of me." Now, whenever a man fails to get the result that his employer asks for he should feel intense chagrin and disappointment, instead of feeling satisfied because he has done the "best he knows how." What we are in the world for is to learn continually to do better than we know how. And be sure that in 99 out of 100 cases your employer has very little interest in hearing that you have done the "best you know how," when you have failed.

Andrew Carnegie came back from England one summer and found that one of his superintendents had made an unusually large profit in his plant. He wrote this man a check for $15,000 as a gift. Another of his superintendents had lost money, and when this man started to explain to Mr. Carnegie the reasons for this loss, Carnegie said ,"Oh, John, don't bother about telling me any reasons. One single reason is good enough. Just tell me that you are a ——— ——— fool—that'll do."

Now, this sounds brutal, and yet it forcibly expresses the mental attitude shared by perhaps the majority of employers when they are given *reasons* instead of *results.* Let me tell you how this fact was driven home in my case.

A workman came up to my house in the middle of the night to tell me that a valve had broken and shut down one of the large departments in the works. I took the earliest train at 6 o'clock down into Philadelphia, hired a carriage and drove all over the city to every dealer who might possibly have the valve on hand, and also to all the establishments who were users of this kind of valve. I failed, however, to find it in Philadelphia. About noon I returned to the works, feeling very well satisfied that I had left no stone unturned in my hunt for the valve. I started to explain to the superintendent just how thoroughly I had done my work, when he turned on me.

"Do you mean to say that you haven't got that valve?"

"Yes, sir."

"Damn you, get out of this and *get that valve!"*

So I went to New York and got the valve.

Not reasons, but results, are wanted.

There, however, is one exception to the rule that you should do just what your employer wants. You, of course, must do nothing mean or dishonest for your employer. If your employer wants you to do anything of this sort, get a new employer.

But what I want particularly to call your attention to is, that in almost all cases success is due not to the brilliant qualities, but to the plain, ordinary, homely virtues—to grit, determination, perseverance; to the willingness and the character required to do ordinary, disagreeable things; to the ability to take a licking and come up smiling, over and over again.

I think I am through now with personal illustrations. I have tried to emphasize the fact that success, character, common-sense and integrity count, and that the most important idea should be that of serving the man who is over you *his* way, not yours; and that this lies, generally speaking, in giving him not only what he wants but also giving him a little extra present of some kind, in doing something for him which he has no right either to ask or expect.[4]

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[3] Russell W. Davenport, at Midvale. (Copley's Frederick W. Taylor, Vol. I, p. 131.)

In an engineering establishment there were ten or fifteen young college men who were all trying to work up into good positions. Among them there was one man of no especial ability. He didn't do especially well at college, although he was an ordinary scholar. He appears to have been endowed, however, with fully the ordinary amount of common-sense. At any rate, he saw an opportunity for advancement which the other young men failed to see.

Most of the departments of the works ran night and day, so that every Saturday night and Sunday urgent repairs were required to keep the place running. Naturally, the work of making these repairs was in no way sought for by these young college fellows. They all had something much more interesting to do on Sunday—either choir practice or lawn tennis or social engagements of some kind. So that the superintendent in charge of repairs had a hard time to get the men whom he wanted to work hard, and chiefly on Sunday. One of these young college men, however, went to the repair superintendent, and told him that he didn't mind Sunday work at all—in fact, he rather liked it. He said he had served his apprenticeship as a machinist, and didn't mind being called upon at any time. This was such a new experience to the repair superintendent that he sent for him to come in on the following Sunday. He did so well that he kept him at work practically every Sunday throughout the year, and also quite frequently all of Saturday night, and, contrary to what usually happened, he never had any kicks or complaints from this young man. All of this man's friends, however, laughed at him and remonstrated with him for being so foolish as to take much more than his share of Sunday work. This was particularly true of the rest of the college fellows. His parents, his social friends, also told him that he was nothing but a fool to work in this way. However, by the end of a year practically every superintendent throughout the establishment wanted this young man in his department, and as a result he was promoted with great rapidity. At the end of two or three years all of the other college graduates were wondering why this man, who really was not as smart as some of them, was given all the promotion, all of the good jobs, all of the best positions.

In another establishment a young man, also a college graduate, had worked up to be at the head of one of the departments. A drain which ran underneath this mill became clogged up. He sent his best foreman and a gang of men to clean it out. After they had tried to do it with jointed rods of all kinds, they failed, and reported to him that the only thing to do was to dig down, break open the drain, and clean out the obstruction. Now this drain was some twenty or thirty feet below the mill, and ran underneath the foundations, which made it extremely difficult to dig, and certainly involved the loss of several days in the operation of the mill. This young man made up his mind that the drain must be cleaned, so he took off all of his clothes, put on over-alls, tied shoes on to his elbows, shoes on to his knees, and leather pads on to his hips to keep from getting cut in the drain, and then crawled in through the black slime and muck of the drain. Time and again he had to turn his nose up into the arch of the drain to keep from drowning. After about 100 yards, however, he reached the obstruction, pulled it down, and when the water had partly subsided backed out the same way that he had come in. He was covered with slime perhaps half an inch thick, all over, which had to be scraped off with a scraper, and his skin was black for a week or two where the dirt had soaked in. He was, of course, very much laughed at, and finally the anecdote was told as a good joke at a meeting of the Board of Directors. The President of the company,[5] however, realized that this was just the kind of joke that his company appreciated. He realized that the company had been saved perhaps one or two thousand dollars in profits by the grit of this young man. It was the first time that it had been called to the President's attention.

A few weeks afterward the President sent for him to come to his office and said, "I have tried to get the oil out of the cylinders of our steam hammers.

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[4] Nevertheless the researches of the biographer of Mr. Taylor have disclosed that many of the illustrations following represent cases in which young Taylor was the "hero," thus illustrating his habit of "disguising the incident so as to avoid the appearance of boasting." (Copley's Frederick W. Taylor, Vol. I, p. 197.)

[5] The President was William Sellers; the company, Midvale; the young man, Taylor. (Copley's Frederick W. Taylor, Vol. I, p. 145.)

I know that you are not in the hammer department. Are you able to keep the oil out of those cylinders?" "Yes, sir, providing you will give me the necessary authority to do it." The President wrote him a letter, stating that he had authority to discharge anyone who disobeyed the orders of this young man in the matter of keeping the oil out of the cylinders, and armed with this letter he returned to the works, and appointed a hammer-man on day shift and one on night shift, for each hammer, part of whose duty it was to see that no oil got into the cylinder of his hammer. He showed him the President's letter and told him that if any oil was found in the cylinder of a steam hammer on his shift he would discharge him, whether he put it there, allowed it to get there, or not. In addition to this, he chained up the various inlets to the cylinder and locked them with heavy padlocks, so as to make it difficult to get at the cylinders to oil them. Before starting to do this, however, he wrote a letter to the President of the Company, telling him that he believed it was a mistaken policy to keep the oil out of the cylinders; that it was his personal conviction that the cylinders would cut without oil and be ruined. The President answered that he had had a steam engine in one of his other establishments running for some twenty years without any oil in the cylinder, and that he would therefore take the personal responsibility of the matter himself.

About three or four months later the company paid a bill of many thousands of dollars to have the cylinders of its steam hammers rebored. They had almost all cut for lack of oil.

This young man, however, had proved by these two incidents, first, that he had common-sense enough to recognize the fact that his employer wanted him above all things to save money; second, that he had the grit and pluck required to do disagreeable things; and third, that he could obey orders even if he personally disagreed with the policy; and these incidents marked the starting point in the career of one of our most successful engineers and managers.

In the spring of 1900 a large company decided to exhibit a big machine in the Paris Exhibition. It was so late, however, when they came to this conclusion that the machines of most of their competitors were already in the exhibition. They, however, were able to obtain space, and it was of course necessary to have the machine in operation at the earliest possible minute. There were a great many young college graduates in the employ of this company. Many of them wanted to go over with the exhibit, and have charge of it, and were fairly well equipped in that they had a certain knowledge of French. It, of course, was of the greatest importance to select men who would be sure to get the machine going in the shortest space of time, and these young college men were surprised to find that two young men were chosen, neither of whom had a college education, both of whom, however, had shown their resourcefulness and their ability to "get there." Many of those in the company, however, were greatly surprised at their appointment, because neither of them spoke one word of French.

These young men arrived in Paris ahead of their machine, and found that a large proportion of the machines which had arrived in their department were still unpacked, and far from being set up, because the rules of the Exhibition required that all of the work done in the Exhibition should be done by official employees, official masons, bricklayers, carpenters, etc. These men saw clearly that if they waited their turn it would be well on into the summer before their machine would be up, so they bought a car-load of bricks, mortar, shovels, etc., for building foundations and had them consigned to themselves in the Exhibition. When the car arrived they pinched it opposite their materials themselves, and unloaded all the building materials at night. The next day there was great horror in the Exhibition when these men were found digging their own foundation and preparing to build it themselves. There was, however, no rule which prevented the exhibitors from doing any work which they themselves saw fit, so the officials of the Exhibition could not interfere with their getting the foundation up. The foundation was done by the time the machine arrived, and at the same time that the machine came into the works they had another car sent in, with rigging materials, tackle, etc., for unloading it. They again pinched their car with rigging materials and their car with their machine into the exhibit opposite their space, and unloaded their 20-ton machine, with the help of one or two other laborers and exhibitors whom they were able to get with them. They placed the machine on its foundation, put up their counter shaft, and had it running before many of the machines which were in the Exhibition before they had started from America.

These young men, who did not speak a word of French, and who were not college educated, fully justified their choice. I received a letter a few days ago from one of them, stating that he had just finished building a works which had cost $600,000, which he had completed in a year and a quarter, and that he was about to begin another works of the same kind which he hoped would be done in eight months. The other of the two young men is at the head of a very successful selling force.

Now, as an illustration of what plain, every-day persistence will do, many years ago, when I was foreman of a machine shop, there was a young man at the head of one of the rather unimportant departments who had been dropped from Annapolis. He didn't have brains and scholarship enough to keep up with his class. My chief business at the head of this department was that of making repairs, and keeping the place running, and all of the heads of the other departments came to me one after another with their breakdowns. They were all in a hurry, and I had to use my best judgment in deciding which repair was of the greatest importance. This young Annapolis failure came into my office one day and explained that he had to have a certain repair made right away. "Well, I'm sorry, but I can't do it. There are a lot of things that are ahead of you."

"Well, what are they?"

"Oh, I haven't time to go all over it, I'm too busy."

He said, "Won't you tell me what other repairs are ahead of mine?"

"No, I haven't time. I'll make your repair as soon as I have a chance."

"Well, what machine are you going to put my broken piece on to repair it?"

"On to the slotter."

"Well, what work is ahead of that slotter?"

"Oh, I can't tell you, I have too many other things on hand."

So my friend went out of my office, walked all of the way across the works, about a quarter of a mile, to the central office, found the superintendent of the company and placed before him a piece of paper for his signature, which read:

"Mr. Taylor. Please tell Mr. . . . . what pieces of work will go in the slotter in advance of his breakdown. I am desirous of having Mr. . . . .'s work done as soon as possible."

He walked all the way back again to my office and gave me that piece of paper. I, of course, wrote at once the names of the parts which were ahead of his. He again walked back to the central office and again returned to my office, with a second paper, reading: "Mr. Taylor. Please do work on the slotter in the following order," stating exactly the time which his work came on. He practiced this same scheme on me enough times for me to find that it paid better to drop all work when he came in the office and answer his questions, rather than to waste time in finally having to write the whole thing out.

Now this quality of persistence certainly is not a very brilliant one, and surely requires comparatively little brains, and yet it was just that quality which has placed this young man at the head of a works employing some 5,000 men.

Brilliant suggestions as to new, great and revolutionary changes and improvements are the last things that your employer wants. He has enough of these at all times to last him for years. He is not looking for some one to tell him what to do. He is looking for some one to carry out the plain, simple, every-day, much needed improvements which are always in sight.

Let me give you an illustration of the fact that one simple idea is enough to last a successful man a life-time. During the Centennial Exhibition, held in Philadelphia in 1876, I left my apprenticeship to take charge of a lot of New England machines that were exhibited. One day an old gentleman came into my exhibit, and I saw at once by the questions which he asked that he was a fine mechanic. I took every pains to explain our machines and tried to sell him some. After a while he sat down and asked me to sit alongside of him. He said:

"What is your idea for success in life?"

I said I didn't know, that I had no particular idea.

"Why," he said, "you must have something that you are working for."

I said: "Yes, sir, I am working to get to be a machinist and earn $2.50 a day."

"Oh, no," he said, "I don't mean that. When I was your age and before I was out of my apprenticeship, I had made up my mind just what I was going to do. I decided that I was going to learn how to do work just a little more accurately than any of the other apprentices around me, and when I had succeeded in doing this, then I decided that I would learn to do it still more accurately than I had done before. Throughout my whole life that has been my one idea. I have never cared so much about the rapidity of the work—although I worked about as fast as other people—but I have always been determined to do a little better work than anyone else around. That is what I am still aiming at to-day—to do better work next year than I am doing this year." He said, "I suppose you know who I am?"

"No."

"I am 'Old Man Sharpe,' at the head of the Brown & Sharpe Company of Providence, R. I."

Now this simple idea has been enough to build up and keep through two generations the great Brown and Sharpe Company at the head of all the companies in this country who are doing accurate work, and probably no finer work, on the whole, is done in any company throughout the world.

Remember that the kind of engineering that is most wanted is that which saves money; that your employer is first of all in business to make money, not to do great and brilliant things, and he wants you to help him in making money, rather than in doing great and brilliant things.

In a large establishment which had enlarged very rapidly, but without a plan which was originally carefully laid out, it became a matter of the greatest difficulty to lay out tracks which were capable of taking care of the traffic, incoming and outgoing, and also between the various departments. The problem of locating these tracks was given in succession to the three best engineers in the establishment, men who were finely educated and experienced engineers. Now laying out tracks is a distinctly monotonous and uninteresting piece of work, with no glory in it whatever, and whether each of these men did their best or not, at any rate they one after another gave up the problem, and said that the buildings were so located that it was practically impossible to make a proper lay-out of the tracks.

In the drafting room was a young man who had merely an ordinary school education, in fact, very little of that even, who was working making cheap drawings, tracings, etc. He saw these men try the problem one after another and give it up, and after they were through he applied to the superintendent for permission to tackle the track problem. The superintendent said, "Why certainly, my boy, go right ahead. Do what you can." In about three months this young man had laid out the tracks so as to solve the traction problem in a complete and satisfactory way. And this is the incident that started a man on his upward career who I am sure you would all recognize as certainly the combined engineer and machinist who has made the largest pecuniary success of anyone in this country.

In another establishment it became necessary to add a number of additional furnaces to the melting department. The flues leading to the chimney of this department were so located that it was very difficult to build a new chimney which should have sufficient capacity to run the old plus the new furnaces without tearing down the old chimney and locating the new one in its place. This would necessarily involve a loss of at least one or two months in time. It appeared to be impossible to add to the height of the present chimney, because, years before, its foundation had sunk unevenly, and the chimney was leaning over so far to one side that its centre of gravity was barely within its base.

There was one young engineer, however, who realizing the seriousness of a stoppage of two months, proposed to build another chimney, on top of the first one, leaning back in the other direction, thus bringing the centre of gravity of the new chimney raised to twice its height back over the centre of the foundation. He carried out this work without even stopping the furnaces for a day. He raised a false sheet iron chimney above where the workmen were building all the time, so that they could build the new chimney with the smoke continually coming out of the top of the old one.

Now, neither laying out tracks nor adding to the top of an old chimney are very brilliant or original feats of engineering, and yet they marked the important events which led to the success of two great engineers.

There is one rock upon which many a bright and ingenious man has stranded, and perhaps the greatest temptation to the engineer who loves his profession is that of indulging his inventive faculty. Many of our brightest men practically spend their lives in worrying over the great improvements and inventions which they have in their minds, and they squander all of their own and their friends' money in trying to make them successful in a moneyed way after they have been perfected. Now for the average man no invention can be looked upon as a legitimate invention which is not an improvement on mechanism or processes or appliances which are already in existence, and which are successful. It is thoroughly illegitimate for the average man to start out to make a radically new machine, or method, or process, new from the bottom up, to do things which have already been done in the past. Legitimate invention should always be preceded by a complete study of the field to see what other people have already done. Then some one or more defects should be clearly recognized and analyzed, and it is entirely legitimate for an engineer to use his ingenuity and his inventive faculty in remedying these defects, and in adding his remedy to the existing elements of the machine or the process which have already been found to work well. Any other invention than this should be looked upon as illegitimate, since it is almost sure to waste the money of your employer, as well as your own, and to result in partial, if not complete, disaster. Throughout the manufacturing world there exists a proper and legitimate suspicion and dislike for the man who is forever coming forward with new and radical improvements and inventions. Let me give you one illustration of legitimate invention.

There was a machine, a large number of which were in common use, and of which there were many designs and types used all over the world. This machine was of such a nature that it battered itself to pieces. Almost all of its parts broke. There was a young engineer who had many of these machines to use in his manufacturing department, and who decided to try to build a machine that would not batter itself to pieces. He spent one or two years in collecting, from all over the world, data about the various machines that had been designed, until he found instances in which some one of the parts of each of the various machines of different designs had never broken. He then copied the design of each of the parts which had not broken, collecting one element from one machine, another from another, another from a third, etc. There was, however, one portion of the machine of which he could find no single instance of a design which had not, at some time or other, broken. He devoted his special energy and ingenuity to the study of this element, and finally evolved what he believed to be a principle which would prevent it from breaking. He then constructed a machine containing all of the parts already existing which had not broken, plus the one of his own design, and patent, which he believed would not break, and as a result obtained a machine which lasted for many years without a single break-down—the first instance of its kind in the history of that art. And this furnishes an illustration of what may be called thoroughly legitimate invention.

Don't kick, certainly don't kick unless you are sure of accomplishing your result. Your kick, in perhaps nine cases out of ten, will result merely in aggravating your employer, whether it is just or unjust, and your common-sense should tell you that it is foolish to aggravate him unless some good is to come of it.

William Sellers ranked undoubtedly in his time as the most noted engineer in this country. It was my good fortune to work under him for several years. During this time I was badly treated by one of the superintendents who was over me. I stood it for a long time, and then decided to go to Mr. Sellers about it. He listened and agreed with what I told him, and then turned to me, almost laughing, and said, "Do you know that all of this impresses me with the fact that you are still a very young man? Long before you reach my age you will have found that you have to eat a bushel of dirt, and you will go right ahead and eat your dirt until it really seriously interferes with your digestion."

Does all of this sound humdrum and commonplace? Yes, it does, but remember that I have been trying to point out the implements and methods which are to be used in obtaining success, and that implements and methods are almost always commonplace. But back of this each engineer should have, at all times, the hope, the ambition, the determination, to do great things; to do things which shall leave the world the better for his having lived in it; to do things which shall bring him into the front rank of his profession; and then to take at least one or two forward steps in his chosen line of work. It is the pleasure, the joy and the delight in doing this, more than anything else, that leads us to become engineers and that keeps us cheerfully at work, in spite of repeated disappointments.

In your desire to do great things, however, do not try for the impossible. Let your common-sense guide and control your ambition. Don't try for perpetual motion; don't look for a diamond mine in the coal fields of Indiana; don't make a machine to fly to the moon; but keep your eyes wide open all the time to see and clearly recognize defects in the machines, apparatus and methods that are immediately around you, and in the line of your regular duties; in those machines and processes which you understand best, not in someone's else field that you don't understand.

Next, clearly define this defect and if possible describe it in words. Then use your ingenuity to find the simplest possible remedy for it.

And lastly, your common-sense to see how, under existing conditions, the remedy can be applied with profit to your employer.

And if conditions prevent your doing it this year, then do it next year; and if not next year, then five years from now. Have patience and grit, and don't give it up.

Now, as I here have laid so much stress on commonsense and character as factors in success, it may well be asked where education comes in. I will tell you.

Young college men who work in any first-class establishment soon find that many of the workmen who cannot talk grammatically, men who chew tobacco, slouch along the street with greasy overalls on, who hardly look up, who are scarcely willing to speak to you politely as you pass them, are intellectually as clear as they are. That is what a young college man can learn through one year's work in a shop.

I remember very distinctly the perfectly astonishing awakening at the end of six months of my apprenticeship, when I discovered that the three other men who were with me in the pattern shop were all smarter than I was. Now when a young man gets it clearly in his head that he is made of the same kind of clay, physically as well as mentally, as these other men, then he finds that his only hope of outstripping them in the race lies in getting a better education—in *knowing* more than they do.

But your knowledge will avail you nothing without energy, grit, pluck, determination, ability to stick to it, character.

Of all the habits and principles which make for success in a young man, the most useful is the determination to do and to do right all those things which come his way each day, whether they are agreeable or disagreeable; and the ability to do this is best acquired through long practice in doggedly doing, along with that which is agreeable, a lot of things which are tiresome and monotonous, going out of your way, if necessary, to find them.

TO EXAMINE the basic danger (of consumer instalment buying) let us take an over-simplified case. Let us imagine a community of 100 persons each of whom has an income which does not vary from year to year. In year one, all pay cash for everything that they buy. They buy 100 units of product. Then the instalment plan begins to descend on the community. In the second year, ninety still pay cash, and buy ninety units. Ten, however, have been induced to buy everything on instalments, payable over a period of two years. This temporarily doubles their purchasing power; instead of having ten units of product, in year two, they can have and enjoy twenty units. The factories supplying the community therefore enlarge their production from 100 units to 110. In year three, this group of ten cannot buy anything new; they are still paying for what they bought in year two. A new group of thirty persons, however, has been induced to buy on two-year instalments, thus consuming sixty units. This year the factories produce, for sixty persons paying cash, sixty units, for thirty persons using credit, sixty units, for ten persons who have pledged their credit, no units—total 120 units. In year four, the remaining sixty cash buyers have been induced to buy on credit, and take 120 units. The thirty new credit purchasers of year three, are out of the market. The original ten are back in again, with twenty units. The factories therefore produce 140 units. Isn't this wonderful prosperity? Production steadily mounting—in four years from 100 to 140.

But what happens next? In year five, we have seventy people out of the market; we have thirty persons buying sixty units. Consumption more than cut in half! The following year is better again, and subsequent years vary, but when we average consumption, year in and year out, we find that it is 100, just what we started with.

This is a rather elaborate way of demonstrating what ought to be obvious—that we cannot permanently enlarge consumers' purchasing power just by extending credit. It would be lifting ourselves by our bootstraps. Juggle the figures any way you like—change the number of people in each category, the time of the instalments, the proportion of each individual's income used for cash payments. The test can only show that an expanding use of instalment payments causes a temporary spurt in production, which must slow down again to the original pace when the credit capacity of the public is saturated. (Quoted, by permission, from an editorial in *The New Republic*, April 7, 1926, page 187.)

Preserving Ideals in Solving Practical Problems[1]

An Engineering Analysis of Ideals as Standards

By C. L. BARNUM
Comptroller, American Radiator Company, New York

THE words "ideal" and "idealism" connote many diverse thoughts of religion, ethics, psychology, sociology and what not. In discussing "Preserving Ideals in Solving Practical Problems" we are not concerned directly with these "idealistic" connotations but rather with concrete objects of attainment. Being an engineer and a business man and addressing engineers and business men, I propose to adhere to engineering analysis which I think is applicable to most subjects, including the subject of ideals.

An ideal, according to the dictionary, is a standard of perfection. Applying this definition to the use of the word "ideal" in connection with practical problems, we have two things to consider: our conception of perfection or fitness and our unit of measurement.

No large project, either engineering or business, is begun without predetermined plans—a plan or conception of the objective, a plan of procedure in reaching the objective, involving a plan of the different steps in attaining it. In engineering the plan is usually laid out in detail on paper. In business projects the plan is not always laid out on paper, though it is being done more often at present than in the past, and the successful business man either consciously or unconsciously (which is hunch) thinks out his objective and plan of action in advance.

Some people will disagree with this, insisting that when an ideal is planned, it is no longer an ideal. In other words, they say, an ideal is unattainable. My conception is different. An ideal should be attainable and this difference is the difference between vision and dreams.

Where decisions with reference to current problems do not seem to fit with "ideals," it is usually due to the fact that the steps in attaining the ideal have not been planned. Incidentally, decisions regarding current problems must be made currently and the man with a plan, who is able to produce a reasoned solution, has a definite advantage. If a decision seems to be contrary to an ideal, is it the decision which is at fault or the lack of a detailed plan against which to check the decision? This question applies to two conditions, one if you are making the decision yourself and the other if someone else is making the decision. In the first case you are a poor engineer and have no excuse. In the second case you are a poor salesman and a salesman cannot be excused for ignorance of fact.

Our difficulty in business today is not so much in getting together on ideals as on our method of reaching them.

There are also differences of opinion as to the different absolute and relative values of the units we use in measuring the steps toward accomplishment of our ideal. Units of measurement are necessary, however, for any standard, and any business or engineering plan must be based on definite standards and expressed in units of measurement.

Our objective or ideal in business is particularly a standard of performance and must be expressed in measurable units. Our plan of action should be measured in the same units, with the addition of the unit of time, if time is not a unit of measurement of our ideal.

It is this unit of time that the individual finds irritating in the attainment of his objectives and, because it is an irritating element, it is the one that is given the most attention both in his own thought and in the thought of others. However, time is a major unit of measurement of our standard or of our ideal only to a relative extent and that extent is dependent upon the amount of consideration it must be given in the development of our ideal.

For example, if a bridge is washed out, our objective is to construct another bridge. In case this bridge has been the only bridge over the river, our ideal is to construct a new bridge as soon as possible. Time is the most important factor in the measurement of our accomplishment. On the other hand, there may be another bridge available and our ideal may be to build the new bridge stronger, more permanent and more beautiful than the old bridge; in this case, time is a unit of our standard, but it is not the controlling unit.

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[1] Paper presented at a special luncheon meeting of younger members of the Taylor Society, Town Hall Club, December 4, 1925.

Expediency is dangerous only to the extent that it is used. If one will only remember that it is a tool to use in temporary or transient situations, expediency has no effect on our ideals. It is only when an expediency decision is allowed to stand without checking against our ideal that we later find that we have permitted an unfortunate and perhaps deplorable condition to exist.

The failure in the installation of scientific management methods has been, in most cases, attributable to the improper consideration of the unit of time. Time has usually been given an important place in measuring the ideal or standard of accomplishment and little or improper consideration in laying out the plan of action.

Any ideal or any true standard must be based on facts. An analysis based on facts of procedure must consider the unit of time and will fix this unit relatively in its measurement of our ideal.

A company losing money requires the same treatment as the bridge that must be put over the river in a hurry. Time is an important element; the liquid capital may disappear while corrective measures are being planned and the first step in attaining our ideal is to save what we have.

Another unfortunate thing for scientific management has been the assumption that methods and principles are the same. We hear the Taylor system confused with principles of scientific management. These principles are, of course, universally applicable but I do not know of any system, Taylor or otherwise, which can be used in applying them under all conditions.

In attaining our ideals we are similarly quite likely to confuse our method of reaching them, our plan of action, with the ideal itself.

I think it is perfectly proper to be stubborn regarding our ideals. They are our own, and a man isn't worth much unless he has them.

As I have suggested, there are other units of measurement than money, but fortunately the accomplishment of ideals can be measured in money alone and in this single unit show a credit balance.

I think it has been demonstrated in several fields of endeavor that the maintaining of ideals is profitable. No large undertaking can be successful without the cooperation, goodwill and earnest effort of all who have to do with it. Whether we are motivated solely by the desire to make money, or also by the desire to make our business world a little better place in which to live or to furnish a little more service to those who are affected by it, our plans and results are the same even though measured in different units. Until others are educated or "sold" on all the units of measurement of accomplishment, it may be necessary to use their vocabularly and the single unit of money.

Some years ago I laid out what I considered an ideal power plant for a company with which I was connected. The then existing plant was scattered all over in different buildings and was a wonderful education as to diversification and inefficiency. The new plant was estimated to cost $200,000 and the money was not available. However, the plan was revised so that each replacement fitted into a general plan that would ultimately result in centralizing all the power in standard units in one location. It gave me a great deal of satisfaction to learn two years ago that the first part of the accomplishment of this plan was so successful that the company went ahead and replaced all the remaining equipment at one time. This was the accomplishment of an ideal, though a very material ideal.

In attaining management ideals, however, we are dealing with the relation of human beings, and while I do not believe in paternalism in any form in industry, to bring about cooperation of workers in a joint endeavor we must necessarily effect a mental stimulus (and perhaps a spiritual one) in our business associates.

In the installation of any new methods the first part of the work is often tedious and discouraging, but after the first successes have obtained cooperation there is a tendency to force the other steps ahead too rapidly.

There is another point where the man with ideals and a definite vision of his ideal has the jump on the other fellow. With a predetermined plan of action the next step and the reasons for it are known. It is possible to justify each step in itself. If the other fellow has a plan, it gives you the opportunity to check yours. If he has not, then there is no opposition.

The engineer has often been criticized by the layman for his use of the word "standard." It is said that one cannot set a standard in this day of rapidly changing thought and progress in industry. The same situation exists with reference to "ideals." It is largely a question of definition. If our ideals are considered standards, based on analysis of facts and expressed in common units of business measurements, there should be no difficulty in maintaining such ideals in the solution of practical problems. In fact, our practical problems become steps in the attainment of our ideal.

In concluding, I wish to quote from the writings of a business associate:[2] "We are prone to term an "Idealist" one who indulges in idle dreams. The real idealist is he whose dreams come true. He it is who possesses that serene unclouded vision of realities unobscured by regrets, fears or hopes. It is he who has the power and courage to look at the sun, not seeking to envelop realities in a pleasing haze. The idealist envisages fearlessly the premises of today, and consequently can read the answer which tomorrow holds." This fits my idea of an idealist.

Trends in General Administration[3]

As Seen by a Specialist in Budgetary Control

By J. O. McKinsey[4]

NOT enough data have been obtained through research in the field of management organization as distinguished from sales management, production management or financial management, to warrant any fixed opinions on the subject. These observations are to be accepted merely as some indication of the trends.

I. Trend to attempt some control of the kind of stockholders.

(a) Sale of stock to employees (other than executives). The greatest tangible asset in this is the encouragement of thrift habits through the installment method of purchasing securities of the firm.

(b) Sale of stock to customers of the firm—this has some very important possibilities.

II. Trend to give consideration to the composition of the Board of Directors. Heads of departments (who make a very good executive committee) are not as desirable for Board in formulation of general policies as persons with outside interests.

III. Trend to select as Chairman of the Board a man other than the president of the company. There is a marked difference between policy making and executive work. The Chairman is the contact man with the outside world. He needs plenty of time to think.

IV. Trend to appoint committees of the Board, as Executive Committee, Finance Committee, etc., to study various problems. The interesting thing in this movement is that the Board today is taking a more active part in the life of the firm.

V. Trend to make the president's job different from what it used to be when the president was a product of the institution—a man who was an authority on all branches of the business. Today staff men are filling the presidency, coming from the law department, the accounting department, etc., men who are not so quick to give decisions as formerly—men capable of analyzing problems rather than men necessarily of dynamic personality.

VI. Trend toward the delegation of authority and responsibility to subordinates—a marked getting away from the one-man basis.

VII. Trend (on account of VI) to fix the responsibility of subordinates. A limited use of charts and instructions is desirable, with provision for expansion of the job when the given man is capable of doing more. Such charting, after all, is but a reflection of thinking.

IX. Trend is again to the placing of emphasis on

(a) Functions of personnel administration

(b) Functions of comptroller

with a vice-president in direct charge of each.

X. Trend to restrict the number of executives reporting to the chief executive—there have been too many departments in the past.

XI. Trend to set up some means for coordination of budgetary control by

(a) Committees

(b) Plans by head of each department.

XII. Trend toward the realization that we must recognize the personal element. (There are not enough good men to go around.) I suggest making up an ideal organization chart first and then trying to get men to measure up to the standards set. Wise executives attribute to their type of organization the failures of some of their men.

XIII. Trend toward the realization that the organization will not run as it should unless we offer the proper material incentives to the major executives of the business.

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[2] Frank C. Kearns, Secretary, Executive Committee, American Radiator Company.

[3] Abstract of a talk before the Chicago Section of the Taylor Society, December 10, 1925.

[4] President of the James O. McKinsey Company, specialists in budgetary control and practice; Associate Professor of Accounting, The University of Chicago.

XIV. Trend toward the realization that a tremendous amount of education of executives is needed and that this is a continuous problem. You can never expect a perfect organization with the ideal man filling every position.

Production Incentives at the Curtis Publishing Company[1]

By Walter D. Fuller[2]

DURING 1925 the Curtis Publishing Company paid to employees more than $300,000 as their share of the economies which they created through production increases. For 1926 this figure will be larger. Of the 5,000 persons upon our payroll, about 3,500 have at the present time an opportunity to share in the economies which they create.

The financial gain to the company through the operation of these economy sharing plans was in excess of $300,000 during 1925. This was in addition to the amount paid to employees.

The amounts paid to individuals are usually substantial—for example, during a recent week a Bindery Machine Operator drew in bonus $11.73. There are 170 employees on these machines; 162 made bonus, averaging $9.00 to $10.00; 8 made no bonus. A Hand Slip Sheeter, for the same week, drew in bonus $10.30. There are 73 employees on this work, 68 made a bonus averaging $8.00 to $9.00; 5 made no bonus. A Folder Operator, for the same week, drew $9.80 in bonus. There are 290 employees on this work; 267 made bonus, averaging $8.00 to $9.00; 29 did not make bonus. A Phonograph Typist, for the same week, drew in bonus $7.27. There are 32 employees on this work; 19 made bonus, averaging $5.00, 13 made no bonus. These operators, however, are paid under a plan which provides for salary increases when production consistently stays above a certain point.

The relation of the bonus to the basic wage varies with the class of work and with the wage. Generally, we plan to pay in bonus to good producers an average of from 25 per cent to 33 per cent of their wages.

The methods by which this sharing of economies is handled is extremely simple. First we determine a unit of production and keep a record of production in the established unit. Then we determine what production we ought to expect as "standard" and what the maximum of production can probably be.

With this information and by a mixture of past record, time study, and a good deal of experience, and what we hope is common sense, we determine the "standard" and the rate of sharing of economies over the standard which we will offer to our employees. "Standards" must always be at a point which when achieved will yield a gain to the company; the rate of sharing must be determined on a basis fair both to employee and to the company. Standards once set and announced are never changed unless basic conditions change.

Requirements of Economy Sharing Plan

Any plan which looks to the mutual advantage of company and employee must be considered in view of certain basic principles, for example:

1. The plan must be defined in advance. This is a first principle, and one easy and practicable to develop.

2. Payments must be substantial. From our experience we know that under proper stimulus and with correct training, workers can materially increase their output. This is true upon widely different activities and it checks with the experience of other institutions. Any concern may take its present payroll and consider it as potential money for economy sharing. Discount this materially, remember that the size of the force eligible for such earnings will be reduced proportionately with increases in efficiency and it will be obvious that there is a very large, adequate and substantial item for economy sharing and for increased company profits.

3. The plan must be simple. Economy Sharing is the simplest and most elementary idea for the sharing of a common gain. It is an idea that the most ignorant worker can understand. There is no vagueness or indefiniteness.

4. It must promote individual efficiency. It is obvious that Economy Sharing does this efficiently and directly. Other plans secure this result only by association.

5. It must promote length of service. Economy Sharing does this and in doing so, it works to retain the truly efficient. Ordinary wage payment methods

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[1] Abstract of an address at a meeting of the Philadelphia Section of the Taylor Society, November 18, 1925.

[2] Secretary, The Curtis Publishing Company, Philadelphia, Pa.

result frequently in the loss of the best people and the retention of the mediocre. Economy Sharing overcomes this difficulty.

6. It should eliminate wastes and improve quality. Economy Sharing does this emphatically. It also does it directly while other plans secure the result only by association.

7. It must build goodwill. Intelligently handled, this is a certain result of Economy Sharing.

8. It must be timely. Economy Sharing possesses this further advantage which is very great and possesses it exclusively. With Economy Sharing it is possible to pay to each worker in his pay envelope his share of the savings he has made during the preceding week.

Curtis efforts along this line have been continuous for years. The clerical effort involved is combined with our Payroll and Statistical work and thus causes but slight extra expense. At present we maintain a staff group of four workers at salaries totaling about $12,000 annually who give their entire time to devising new plans, extending and revising old ones and straightening out difficulties.

It should be noted that our present plans are based upon the factor of production which is the only true index of worth, rather than upon service, wage or position, all of which are merely indirect means of recognition. We employ individuals to produce goods, not necessarily to spend certain hours within our plant. Production and that alone (quality being considered) is the only sound basis for judging material services.

In installing such methods, we first devise the plans and set standards and rates. Then the whole matter is taken to the Department Manager and an attempt is made to "sell" him the idea.

Usually this is successful, but if not, the plan is revised and is again presented for acceptance. We must "sell" the manager before the plan can be made effective—no plan is ever forced on a manager by executive action.

MANAGEMENT week this year is scheduled for October 25 to 30. The subject is "Progress in Waste Elimination." W. H. Leffingwell, representing the Taylor Society, is Chairman of the national committee, and Ray M. Hudson, Chief of the Division of Simplified Practice, the U. S. Department of Commerce, is Secretary.

Balancing Manufacturing and Distribution[1]

How Merchandising Managers Coordinate Factory and Sales Departments

By Henry S. Dennison[2]

THE outstanding thought of the discussion this evening is to be the relation of manufacturing to distribution. Unbalanced manufacturing and distribution relations are bad and the solution is the establishment of the proper balance.

The Dennison Company has worked out a method of balancing these relations and has carried it out in fairly finished form for about twelve years and in an elementary form since 1906. Previous to this we had all the gap between the selling and factory departments that anybody wanted. At that time the factory and sales department considered it quite a stunt to put something over on each other, but this internal conflict between these principal divisions was a serious matter as far as the progress of the business was concerned.

This gap is natural, however, because the work in these two departments centers upon two entirely different phases of the business and calls for different types of men. The lack of understanding is continuous and very real and is due to different processes of working. This great gap between the two is found in concern after concern. Considering, then, this natural lack of understanding, how can we expect policies of coordination to be worked out by just asking the two to get together? A basis of mutual understanding must be established before any real progress can be made. This must be better and higher than a compromise or than the domination of one department by the other.

Looking ahead into the future and correctly gauging what is to come is a vital part of management. Who is going to see to this, selling or factory? The powers of constructive imagination of both are practically used up in their daily work. Important steps come through occasional invention in the factory or the buying of some timely article to create new sales, but this does not take the place of systematic foresight. There must, therefore, be a third party to do this looking ahead. This third party is the merchandising manager.

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[1] Abstract of a talk at a meeting of the Eastern Massachusetts Section of the Taylor Society, Boston, December 12, 1925.

[2] President, Dennison Manufacturing Company, Framingham, Mass.

An improvement in one item some years ago, marketed by a competitor, brought out the idea of subdividing the company into what might be called the Dennison Tag Company, the Dennison Box Company, etc., in order to provide for closer concentration of attention on each line. This subdivision was carried out in the usual Dennison conservative way. Men interested in some one particular line of the work had meetings about twice a year to talk over phases of that line of the business.

This system was worked out in natural, simple steps until five merchandise managers were established. A sixth will be appointed the first of next January on account of the growth of one of the lines which is now too large for one man. These men use the factory as a natural headquarters and travel about one hundred days in the year in order to get first hand information regarding sales needs and chances. All that has been done in coordination between the selling department and the factory has come through these men. Every question of change in style, size, etc., must be considered by both departments and both equally—one is not dominant over the other. The elimination of slow moving styles or sizes or the creation of new ones must be considered by both sides in conjunction with the merchandising manager.

The question of price is also one of the great important factors of merchandising. Changes of color, shape, form, size, content and raw material used are going on all the time. There is not one great campaign, but a constant correction. The price cannot be set by either the factory or the selling department. Neither could make the right price, but they are necessary parties to right action. A low price is always one way to make sales, but is not always just to the factory. Price making is one of the most difficult things going. The normal price is the one which will make the largest figure if the goods it sells is multiplied by the margin. This must be worked out by a man farther removed from the pressure to make sales than is the sales department. The price makes the quantity and the quantity makes the cost. The price should be set with the idea of what is coming. Real pricing must price a bit into the future and must be ahead of the up swings as well as ahead of the down swings. It is better to lead the market than to follow.

Scheduling is a function of the merchandising manager and is used in his coordination work. The factory can only see the past and cannot see the actual markets of today. The merchandising manager can see more clearly, however, as he uses the past in the light of the present and future and lays out the general lines of manufacturing. In some lines, the merchandising manager outlines the manufacture quite specifically, while in others he is more general. He sets the quantities to make up, the lines to be carried, the prices to be charged and takes charge of the scheduling for their manufacture.

The merchandising managers get out into the field to see what the public is grabbing for. They have no men directly under them. They are not responsible for sales or the control of salesmen. The merchandising manager is really off to one side to do his own individual work. He plays a very strong part in the delivery time of merchandise and the increase in new equipment. Much equipment has been purchased on orders received at the factory when there was no real business demand. In one case, new equipment was purchased for a new line on the strength of orders received from a thousand or so dealers who simply wanted enough material to get a small stock for their shelves. The merchandising managers make it possible to create new lines and yet withhold them until the right time comes to market them. We consider them, in fact, wholly indispensable to any proper balancing of manufacturing and distribution.

Scientific Marketing of a Perishable Product[1]

How Careful Analysis and Resultant Process Control Has Reduced the Spread Between Producers' Return and Consumers' Cost of Milk

By Charles F. Adams[2]

DURING the World War, a Fair Price Committee, of which the writer was a member, operating under the Food Administrator, attempted to ascertain and publish weekly a scale of fair wholesale and retail prices of staple food products for a consumers' guide, and to prevent, or at least, make more difficult, any substantial profiteering on the necessaries of life. The result of this committee's work was successful on most commodities, but in the case of fluid milk, the spread between the producer's return and the consumer's cost was so much greater than on other perishable foods, that our committee spent much time in investigating the causes, and finally gave it up as a hopeless task. Figures furnished us from various distributing and producing sources indicated, if true, that every one concerned in milk production or distribution not only made no profits but, as a rule, lost substantial sums annually.

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[1] Digest of a talk at a meeting of the New England Section of the Taylor Society, Twentieth Century Club, Boston, February 5, 1925.

[2] President, John T. Connor Company, Boston.

Because of this peculiar and untenable state of affairs and the repeated scoffing of my ideas of possibilities and plans offered to the distributors, and because I believed that milk could be merchandised the same as any other perishable commodity, I gave the matter further personal study after the committee ceased to function at the close of the war. I investigated far enough to arrive at the following definite conclusions:

1. The producer was applying to the cost of milk expenses not properly a part of its cost.
2. The producer was not crediting to the cost of milk production items that the dairy was wholly or in part entitled to.
3. The average distributor or jobber of milk was not vitally interested in the sale of fluid milk, as he made a substantial profit on the surplus milk not sold as fluid. (This profit would not appear in the statements submitted to the Fair Price Committee in their investigation of the fluid milk problem and its profits or losses.)
4. The law of supply and demand was not allowed to function properly in the commodity milk.
5. A tremendous economic waste had developed in retail milk delivery through unnecessary duplication of competitive routes in many districts.
6. A substantial loss of time occurred between the production of milk and its pasteurization and consumption which not only injured its quality, its food value, and consequently its sale, but also resulted in abnormal waste or a larger surplus for manufacture, all of which worked directly against a reasonable spread in price between producer and the consumer of edible milk.
7. An abnormal bottle expense because of the lack of responsibility of the consumer for empty bottles.

All these conditions, considered together, explained the formidable drain on the vitality of the milk industry and also offered an attractive invitation and economic opening for any chain store operator to enter the milk business,—as chain store managements have waded through and solved many similar problems in working out their place under the sun.

Knowing full well that any milk we offered would be subjected to unusual investigation and examination by health authorities and that every mistake we might make would be magnified a hundred fold by the old regime of milk interests, we devoted much time, before starting, to the selection of a source of supply with able management and perfect control, capable of producing large quantities of milk so far above the legal standard of health board requirements that there would be but a chance in a million for us to be successfully attacked from that quarter, which was the vital spot.

Our selection has proved even safer than our seemingly ridiculous estimate, as only one bottle, out of more than twenty-five million sold, has been found by health authorities to test below the legal standard of butter fat, and not a single instance of harmful bacteria has been found. This record has been made even though boards of health in our territory for a year or more spent a substantial part of the time of their departments in examining our product.

We located what, we believed, would prove to be such a supply at Bellows Falls, Vermont, only a few hours by train from Boston. The Bellows Falls Cooperative Creameries, Inc., had been formed and was financed and controlled by a group of dairymen, second to none in New England, who had ample cause to feel dissatisfied with their past experience in the marketing of their product. After a few conferences we formed an alliance which completed a direct channel from producer to consumer. Their plan of organization was a simple one, financed by a substantial investment by each producing member. Their plant was in the process of erection and was capable of being adapted, before completion, to suit our mutual requirements—namely, the receiving, pasteurizing and bottling of fresh milk—and equipped as well to care for any surplus not sold.

We knew that we had many advantages but we carefully considered every link in our chain of procedure, making doubly sure, as we developed the plant and our plans, that there could be devised by anyone no more economical way to produce lower costs that might bring about a disastrous end to our venture. We realized that almost unlimited capital could be marshalled against us if we showed signs of succeeding. The advantages that we had were apparent. Some of them seemed impossible of duplication by any establishment doing business under the old order of things:

1. Control of production.
2. Control of quality.
3. Sterilized cans daily available to our members for their product.
4. Pasteurizing and bottling when product was fresh.
5. A minimum of handlings.
6. Gravity control from receiving door through entire plant to railroad car door and a straight line from plant to consumer on the outgoing milk and returning empties via our 250 city stores.
7. No duplication of a foot of territory or a ton mile of transportation.
8. Time saved which made for a superior product as it reached the consumer's hands. (The freshness of milk is vital.)
9. Cash sales only with charge for the bottle as against 45 to 60 days' time before the producer received the money for his product. This alone furnished all the working capital the plant required and saved a tremendous bottle waste. Since the consumer was reimbursed for the bottle on its return, he treated it as of value.

The result of these advantages worked out approximately as follows:

Our plant expenses for preparing and bottling have been reduced to less than one-quarter the estimate given to the Fair Price Committee as the usual plant cost of bottling, pasteurizing, etc.

Our loss on the bottle account is one-twentieth the estimate of loss furnished the Fair Price Committee.

Our cost of delivery to consumer's hands at our store is one-quarter the cost as given by the large distributors to the Committee for a bottle of milk delivered to the home—no middleman or endman, no organization dues, no brokerage or selling expense to the producer.

The results can be covered in a very few words: The highest grade of milk at 33 1/3 per cent lower price to the consumer with as large, or larger, return to the producer together with a sure daily market for his product. A plant that is being paid for by generous amortization charges and annual dividends to producers on their cash investment and a most attractive quality product available at our stores at a price well within the reach of the masses. All of this has been accomplished by cooperative effort in the application of the principles of scientific management in the fields of production and marketing.

News of the Sections and Student Branches

Programs and Personnel

FROM various sections of the country comes news of the interest of members in section activities and of successful section meetings on a variety of subjects. The report following lists meetings during the current season which have been reported to the New York Office.

Eastern Massachusetts

The Eastern Massachusetts Sections elected officers at its January meeting: Chairman, T. A. Smythe, Dennison Manufacturing Co., Framingham; Secretary-Treasurer, R. L. Tweedy, The Manufacturers' Research Association, Boston; Chairman of Arrangements Committee, Halbert G. Burton, Walworth Company, Boston.

The current year's meetings have included:

November 18. Joint meeting with Associated Industries of Massachusetts, Bureau of Commercial and Industrial Affairs of Boston Chamber of Commerce, Harvard Mercantile Health Board, Massachusetts Society for Mental Hygiene, Retail Trade Board of Boston and the Society of Industrial Engineers, on "Practical Psychology in Business." Wallace B. Donham, Dean of Harvard Graduate School of Business Administration, presiding; addresses by Dr. C. Macfie Campbell, Director of Boston Psychopathic Hospital; Dr. Abraham Myerson, Professor of Neurology, Tufts Medical School; and Dr. Elton Mayo, Wharton School of Commerce and Finance.

December 14. H. S. Dennison, President Dennison Manufacturing Co. "Balancing Manufacturing and Distribution."

January 25. R. A. Feiss, Dennison Manufacturing Co. "Organization in Industry."

The next meeting is an all day session, Friday, May 7, with the parent Society cooperating. The papers include "The Manufacturers Research Association Wage Payment Plan" by A. B. Rich, Assistant Manager of Works, Dennison Manufacturing Co.; "The Management Movement" by H. S. Person, Managing Director of the Taylor Society; and "Top Control" by John H. Williams, Consulting Engineer, New York.

Central New York

The Central New York Section at its December 11 meeting elected as officers: Chairman, Robert Julius Andersen, Bowen Products Corporation, Auburn;

Vice-Chairman, C. L. Nicholson, 2nd, Pass & Seymour, Syracuse; Secretary-Treasurer, E. F. Papworth, Brown-Lipe-Chapin Division, General Motors, Syracuse; members of the Executive Committee: Percy S. Brown, Corona Typewriter Co., Inc.; Will H. Smith, International Heater Co., Utica; George H. Newman, Syracuse Chilled Plow Co.; Dr. Donald A. Laird, Colgate University.

The following meetings have been held:

October 9. W. W. Bates, Assistant to General Manager for Personnel, Delaware and Hudson Company, "Personnel Activities of the Delaware and Hudson Railroad."

November 7. Guests of the Colgate University Taylor Club at Hamilton, New York. See report on page 86.

December 11. Raymond Starr, Assistant to the Planning Engineer, Corona Typewriter Co., Inc., "A Graphic Method for the Determination of Economical Lot Sizes."

January 29. A. B. Merrill, Vice President of the First Trust & Deposit Co., Syracuse. "The Banker's Attitude Toward Industry."

February 26. Arthur L. Mann, New York State Department of Education. "World Conditions Affecting American Industry Today."

March 26. Joint meeting with local associations of Purchasing Agents, Cost Accountants and Credit Men. Dr. P. G. Agnew, Secretary, American Engineering Standards Committee. "International Standardization."

April 30. Norman T. Thomas, Agent of the Utica Steam and Mohawk Valley Cotton Mills. "Modern Methods in Textile Manufacture."

New York Southern Tier Counties

September 14. W. H. Leffingwell, Management Specialist, "The Use of the Measuring Stick in the Office."

October 12. H. S. Owen, Production Manager of the Ritter Dental Manufacturing Co., Inc., Rochester. "Determination of Manufacturing Order Quantities."

November 9. Ray W. Darnell, Corona Typewriter Co., Inc., "Control and Costs Through Standard Costs."

December 14. Joint meeting with the Industrial Relations Association, Elmira District. W. W. Bates, Assistant to General Manager for Personnel, Delaware and Hudson Company. "Personnel Activities of the Delaware and Hudson Railroad."

January 11. Myron J. Hayes, Works Accountant, Eastman Kodak Co. "Furnishing to Foreman Cost Information Which Produces Results."

February 8. C. B. Hutchings, Brookmire Economic Service. "The Necessity for Research and Efficiency in Sales."

March 8. S. G. H. Turner, President of the Second National Bank of Elmira, and of the Shepard Electric Crane & Hoist Co., Montour Falls. "Financial Problems of Management."

April 12. A. E. Rhodes, Treasurer and Assistant General Manager, American La France Fire Engine Company, Elmira. "Finance."

At this April 12 meeting, the following officers were elected: Chairman, Earl G. Crooks, Willys Morrow Co.; Vice-Chairman, Edgar D. Sebring, Corona Typewriter Co., Inc., who has so long served the section as Secretary; Secretary-Treasurer, Otto Hilbert, Corning Glass Works; and Directors, Frank A. Hatch of Shepard Electric Crane & Hoist Co., J. C. Kennedy of Kennedy Valve Manufacturing Co., J. H. Brautigam of American La France Fire Engine Co., and Benjamin Rathbun of Chemung Foundry Corporation.

April 28. Joint Meeting with the Industrial Relations Association, Elmira. Arthur L. Mann, Supervisor of Industrial Education of the State Department of Education. "Fundamentals of Foremanship."

At the June meeting, the retiring chairman of the section, Frank A. Hatch, Vice President and General Manager of the Shepard Electric Crane & Hoist Co., will be the principal speaker.

Philadelphia

The Philadelphia Section, headed by Charles N. Underwood as chairman and Victor S. Karabasz as secretary, has cooperated with the student branches at the Wharton School and at Temple University.

The following meetings have been held:

October 14. Dr. H. S. Person, Managing Director of the Taylor Society. "Increasing Complexity of Management." Percy S. Brown, Works Manager, the Corona Typewriter Co., Inc. "What the Taylor Society Can Do for Managers."

November 18. Walter Fuller, Secretary, Curtis Publishing Co. "Standardization Work in the Curtis Publishing Co."

December 16. J. L. Stone, head of Statistical Department, Henry Disston and Sons, Inc., and S. L. Kederski, of the same organization, "Scientific Business Forecasting."

March 15. Elton Mayo, Research Associate, Wharton School, University of Pennsylvania. "Industrial Fatigue."

Chicago

The Chicago Section has been active this year under the leadership of Richard M. McClure, Secretary and Treasurer of the Wirebound Box Manufacturers' Association, President; Oliver G. Brain, Vice-President of the Brunner & Simmons Co., Inc., Vice-President; and Edward D. Byrnes, Sales Manager of the W. G. Lloyd Company, Secretary and Treasurer.

The following meetings have been held:

December 10. J. O. McKinsey, Consulting Engineer, "Trends in General Administration."

January 27. Henry P. Dutton, of Northwestern University, "The Regularization of Employment," based upon H. Feldman's book on that subject.

February 24. C. H. Fox, Vice President, Chicago Trust Company, on "The Banker's Place in Management." Discussion led by C. S. Brantingham, President, Emerson-Brantingham Company, Rockford.

March 31. Round Table discussion of Donald A. Laird's new book "Increasing Personal Efficiency."

Plans for the remainder of the year include a luncheon meeting on May 5 and a dinner meeting on the evening of June 1 at which Dr. H. S. Person will be the guest of the section.

San Francisco

George L. Bell and H. K. Hathaway, San Francisco members, are working toward the organization of a local section there. They are holding regular monthly meetings at the San Francisco Commercial Club, with an average attendance of ten to fifteen. So far these meetings have been informal dinners with discussion of problems confronting those present. Any members of the Society traveling to the coast are urged to meet with the group and help establish contacts with other parts of the country.

New York Metropolitan Section

The New York Section has continued its activity this year under the leadership of C. L. Barnum, Comptroller American Radiator Co., Chairman, and B. Eugenia Lies, Director of Planning, R. H. Macy & Co., Secretary-Treasurer. At the last meeting of the year Miss Lies was reelected Secretary-Treasurer and the following members elected as an Executive Committee: Wallace Clark, Consulting Management Engineer; Edmund E. Lincoln, Chief Statistician and Economist, Western Electric Company; Joseph A. Piacitelli, Engineer, Barber Asphalt Co.; T. L. Preble, Regional Service Manager, The White Motor Co.; and Paul Quattlander, Best & Co.

The following meetings have been held this past season:

October 15. "Planning and Control." Discussion by C. W. Lytle, Director of Industrial Cooperation, New York University; Ralph Peters, Secretary, J. F. Tapley Company; Robert T. Kent, Superintendent of Prison Industries, State of New York; John H. Williams, Consulting Engineer and Wallace Clark, Consulting Engineer.

November 19. Joseph A. Piacitelli, Engineer, and John H. Wellers, Manager, of the Barber Asphalt Company, Maurer, N. J. "Some Recent Applications of Motion Study."

January 21. T. L. Preble, Regional Service Manager, White Motor Co. "Management of Automotive Service." Discussion by H. R. Cobleigh, Secretary of Service, National Automobile Chamber of Commerce, and Charles P. Staubach, agent at Newark, N. J., of the Burroughs Adding Machine Co.

April 15. Willard P. Freeland, Assistant Professor of Marketing, Massachusetts Institute of Technology, and Marketing Counselor with Cowan, Dempsey and Dengler, New York. "Progress toward Science in Marketing." Discussion by Charles W. Hoyt, President, Charles W. Hoyt, Inc.; Wliliam H. Ingersoll; Charles J. Crockett, Sales Manager, A. A. Vantine & Co., Inc., and Paul T. Cherington, Director of Research, J. Walter Thompson Co.

Japanese Branch

A public meeting of the Japanese Branch of the Taylor Society was held on March 10 at the Toyo Building, Tokyo. Paymaster Commander T. Mogi, a member of the Taylor Society, delivered a lecture on "The Rationalization of Operation Time." Discussion followed the lecture. The audience included 135 guests besides 7 members.

Colgate University Taylor Club

The following officers were installed at the April meeting: President, Ray Van Horn; Vice-President in charge of speakers, Harrison L. Frieze; Vice-

President in charge of entertainment, Alan Wilcox; Vice-President in charge of publicity, T. P. N. Wagner; Vice-President in charge of Employment, F. H. Dillingham; Vice-President in charge of Scholarship, Robert Elwood; Secretary, Robert Enslin; Treasurer, Philip Payne; Counsellor, Donald A. Laird.

On November 7 the club entertained the Central New York Local Section, special features including a football game between Colgate and Providence, a tea dance with the Colgate chapter of Phi Kappa Psi Fraternity as hosts, and a dinner followed by a meeting at the University Chapel, with Dr. Lillian M. Gilbreth, President, Frank B. Gilbreth, Inc., giving the principal address on "Recent Developments in Motion Study."

Other speakers during the year have included Dr. H. S. Person, Ordway Tead, Edward N. Johnston, Dr. Robert Moore, and Robert Julius Andersen.

On April 30 and May 1 the club plans a field trip to the Corona Typewriter Co. and Wickwire Brothers Co.

Plans are already being laid to entertain the Central New York Section again next fall, when on October 2 the guests are promised another "feast of football, food, and management talks."

Reviews

Conferences, Committees, Conventions and How to Run Them. By Edward Eyre Hunt. Harper and Brothers, New York, 1925. Pages xiv, 218.

One who has not carried the responsibility of organizing an important meeting has no conception of the amount of labor involved. Plans must be laid sometimes a year in advance and proceedings must be planned to the last detail. The more detailed and thorough the planning, the smoother the convention will run and the less in evidence will be the details of planning and execution. This feature is emphasized throughout this book: as the author states, the key-note of the work is pre-planning. It cannot fail to be of value to those charged with the responsibility for organizing conferences and conventions.

The book is based largely on the methods of organizing and directing governmental conferences. It considers the problem of such conferences in great detail, and presents much illustrative material in the nature of forms and reports. This should be of suggestive value to those concerned with other types of conventions. We believe, however, that the work could have been made more valuable by including in full, instead of dismissing in a few paragraphs, the elaborate and well-organized routine for the planning and conduct of a convention of a major technical society such as, for instance, the A. S. M. E., with which the reviewer happens to be familiar.

ROBERT T. KENT[1]

The Administration of Industrial Enterprises. By Edward D. Jones. Revised and Enlarged Edition. Longmans, Green & Co., New York, 1925, pages 618.

In 1916 Professor Jones wrote an outstanding statement of "first class practice in the administration of industrial enterprises." He has now "revised and enlarged" that statement and in doing so more than doubled its length. So much new material has been added, however, that the expanded edition maintains throughout the conciseness of the original. Moreover, this new material has been so fully assimilated and the old material so carefully integrated with it that the author writes almost throughout with the freshness of an original undertaking. There is the same simplicity, vigor and clarity, the same orderliness and comprehensiveness; there is the same union of a scholar's range of knowledge and appreciation of values with the sound common sense of the practical manager. But for the most part the new volume is new, not merely annotated or expanded.

Since 1916 the world in general, and industry in particular, has experienced much and been much changed by that experience. Conditions and practices that prevailed in 1916 no longer prevail. Certainly "labor is not what it used to be." Fortunately, management is not either. And in becoming a new and better management, management has developed much valuable technique. It is this great development in managerial principle and practice of the past decade that Mr. Jones has made the basis of his renewed book.

The book is thus a comprehensive and up-to-date statement of the principles of factory administration in all its aspects from the choice of a location and the provision of buildings, facilities and power, to the shipping of the merchandise, the extension of credit and the collection of invoices. Even merchandising and selling are touched on briefly.

Because of its broad scope and limited size the book confines itself to essentials. In spite of its broad scope and limited size, it is precise, definite and illuminating throughout. It is rich in carefully chosen quotations from leading industrial executives and yet it is only in rare spots that one feels that the author has provided merely a digest of current opinion in place of his own seasoned judgment. The book is also rich in parallels from other fields of administration than industry. The author seems over-influenced by the technique of military organization and a little unaware of the possibilities of maintaining industrial integration by means more cooperative and creative than mere clarity in lines of authority. Yet he is at all times as intensely aware of human, as he is of practical, values.

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[1] Past chairman, Management Division, A. S. M. E.